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CELASTRUS SCANDENS, Lin.

By C. Henry Bernhard, Ph.G.

From an Inaugural Essay.

Nat. Ord. Celastraceæ.

Common Names: Climbing Staff Tree, False Bitter-Sweet, Fever-twig, Staff Vine, Waxwort and Shrubby Bitter-Sweet.

In the preliminary examination of this drug I have used, as far as it was found practicable, the method proposed by Henry B. Parsons, Ph.C., in the April number of the "American Journal of Pharmacy," 1880.

I. Preparation of Sample.—The bark was obtained at a wholesale drug house in this city and, after careful garbling, was reduced to a moderately fine powder and placed in a clean dry bottle.

II. Estimation of Moisture.—Five grams of the powdered bark were dried for about 4 hours at 200°F., weighing at different times to determine when it ceased to lose weight. Loss, by this treatment, 11·62 per cent.

III. Estimation of Ash.—Two grams of the powdered bark were placed in a weighed crucible and, after careful ignition, the weight of residue was determined. This gave 7·52 per cent. of ash.

A. Amount Soluble in Water.—The ash from 5 grams of bark was treated with several portions of distilled water; the amount soluble was 21·92 per cent. The solution was examined and found to contain sulphate, chloride and carbonate of potassium, and sodium.

B. Insoluble in Water, Soluble in Dilute Hydrochloric Acid.—The residue from *A* was treated with dilute hydrochloric acid, which took up 96 per cent. of the remaining ash. The solution contained iron, magnesium, calcium and phosphoric acid.

C. Insoluble in Water and in Dilute Hydrochloric Acid, Soluble in Concentrated Sodic Hydrate.—Nearly the entire amount of residue was dissolved and proved to be silica.

IV. Estimation of Benzol Extract.—One hundred grams of the powdered bark were exhausted with pure benzol, and the percolate evaporated until it ceased to lose weight. The amount of extract thus obtained was 8·75 grams or 8·75 per cent.; and it was of a yellowish-brown color.

This extract was treated with distilled water and with very dilute hydrochloric acid; the solutions examined for alkaloids and glucosides gave negative results. 93 per cent. alcohol took up 5·6 per cent. of the extract. Upon evaporation, there remained a resinous body having a yellowish-brown color and the odor of the drug.

An alcoholic solution of this extract gave a precipitate with an alcoholic solution of acetate of lead. The precipitate was collected, washed with alcohol and freed from lead by H_2S. Upon evaporation there remained a brown amorphous mass, soluble in ammonic hydrate with the production of a deeper color. From this solution it was precipitated by an acid, showing it to be an acid resin insoluble in water. Its alcoholic solution, with ferric chloride, gave a deep green-brown coloration. An infusion of the bark did not precipitate gelatin from its solution, which would indicate the absence of tannin.

The filtrate from the lead precipitate was then treated with an alcoholic solution of sub-acetate of lead, which caused a precipitate; after washing and freeing this precipitate from lead, the alcoholic solution was evaporated, leaving a red-brownish-yellow, amorphous and tenacious mass, sparingly soluble in water. Its alcoholic solution, with ferric chloride, gives a green color due to the acid resin not precipitated by the neutral acetate of lead.

The resin in solution, not precipitated by neutral or oxy-acetate of lead, was freed from lead and evaporated, which left a soft, brownish-yellow mass having the odor of the drug and, at first, a bland taste, but soon became quite acrid. It is soluble in alcohol, ether, benzol, chloroform, carbon disulphide and sparingly in distilled water. This is a neutral resin.

The soft, resinous matter which remains undissolved after treatment of benzol extract with alcohol, as above, is of a greenish-brown color, inodorous, soluble in chloroform, bisulphide of carbon and partly in ether. The substance which remains after treatment with ether is a caoutchouc-like body, very tenacious and elastic, not affected by strong acids or alkalies, is soluble in bisulphide of carbon and chloroform.

V. Examination of Alcholic Extract.—The powder not dis-

solved by benzol was dried and completely exhausted by 80 per cent. alcohol; the extract thus obtained, after evaporation, was of a soft consistence and of a dark brownish-yellow color, and of a sweet nauseous taste.

A. Absolute alcohol took up the greater portion of the alcoholic extract.

a. Soluble in Water.—The absolute alcohol extract wat then treated with distilled water which took up a portion. The solution was of a light brown color and reduced Fehling's solution; presence of glucose. Solution of gelatin was not precipitated and no change with iron solution; absence of tannin. Subacetate of lead gave a precipitate, the filtrate containing glucose.

b. Insoluble in Water.—b^1. *Soluble in Dilute Hydrochloric Acid.*—The absolute alcoholic extract which was insoluble in water was treated with very dilute hydrochloric acid; the resulting solution gave a slight yellow precipitate with Mayer's solution and, upon evaporation, left a slight residue.

b^2. *Soluble in Dilute Ammonic Hydrate.*—Ammonic hydrate dissolved the entire amount of extract not soluble in HCl, and it was again precipitated by an acid; acid resin.

B. Insoluble in Absolute Alcohol.

c. Soluble in Water. c^1. *Precipitated by Subacetate of Lead.*—That portion of 80 per cent. alcoholic extract which was not dissolved by absolute alcohol was treated with distilled water and the resulting solution precipitated with subacetate of lead; the precipitate collected, washed and freed from lead gave, upon evaporation, a brown residue.

c^2. *Not Precipitated by Subacetate of Lead.*—The filtrate from c^1 was freed from lead. Iodohydrargyrate of potassium gave a yellowish precipitate; iodine and iodide of potassium solution, a brown precipitate; phosphomolybdic acid, a greenish-white precipitate, and the same reagent added to an alkaline solution, a blue evanescent coloration. Fehling's solution gave a copious precipitate.

d. Insoluble in Water.—d^1. *Soluble in Dilute Hydrochloric Acid.*—The solution gave reaction for glucose.

d^2. The portion insoluble in dilute hydrochloric acid was soluble in ammonic hydrate and reprecipitated by an acid.

VI. Cold Water Extract.—The powder exhausted by 80 per cent. alcohol was next treated with cold water, the infusion concentrated and the gum precipitated with stronger alcohol. This was of a

fawn color. The alcoholic filtrate still held in solution coloring matter and extractive matters.

VII. TREATMENT WITH ACID.—The powder exhausted by cold water was boiled with a 1 per cent. solution of sulphuric acid for six hours, adding water from time to time to preserve the measure. This treatment converted starch and its isomers into glucose. The solution thus obtained was freed from its acid by barium carbonate and then examined. With Fehling's solution it produced a large amount of precipitate—starch; the aqueous decoction of the bark showed presence of sugar by Fehling's solution, and starch by iodine.

VIII. Caustic soda (20 grams to the liter of water) yielded with the powder a brownish-red liquid which was not further examined. The residue now consisted of cellulose.

By distillation with water, the bark yielded a volatile oil of a rather agreeable odor.

Since, in the above examination, reactions indicative of an alkaloid were obtained, its isolation was attempted from two pounds of the drug by various methods, but without success, and the reactions were therefore most likely produced by other organic matters. The alcoholic tincture contained an acid resin which, after precipitation by lead acetate and isolation, was amorphous, brown or greenish-brown, brittle, inodorous, soluble in ammonia, producing a deep-colored solution from which it was precipitated by an acid; with ferric chloride, its alcoholic solution gave a green coloration; barium hydrate solution added to its ammonia solution produces a brown precipitate.

The filtrate from the lead precipitate yielded a red-brownish-yellow mass having the odor of the drug, at first of a bland taste but soon quite acrid. It is sparingly soluble in distilled water; soluble in ether, benzol, chloroform and carbon bisulphide; insoluble in ammonia.

RECAPITULATION.—The bark of Celastrus scandens may be said to contain: Acids in combination—sulphuric, hydrochloric, phosphoric and silicic; bases in combination—potassium, sodium, magnesium, calcium and iron; an acid resin and a neutral resin, starch, sugar (glucose), gum, a caoutchouc-like body, coloring matter, extractives and a volatile oil.

A tincture of the bark made with dilute alcohol is unstable, producing a precipitate partly soluble in ammonia and partly in alcohol. Glycerin will not prevent this deposit: and, as it is more than probable that the activity of the drug is due to the resins and volatile oil, a

better menstruum would be 80 per cent. alcohol, which affords a permanent preparation.

The infusion and decoction are both unsatisfactory preparations; in consequence of the large amount of sugar which the bark contains, they rapidly undergo fermentation.

ASCLEPIAS TUBEROSA.

By Alton Clabaugh, Ph.G.

From an Inaugural Essay.

When the drug is distilled with water a distillate is obtained which has the odor of the drug. A solid substance, lighter than water, comes over with the distillate, and is found floating on the surface of the liquid. Upon agitating the distillate with chloroform, separating and allowing it to evaporate spontaneously, there was obtained a few globules of oil, which were scattered around the sides of the beaker, and a small quantity of a very odorous, crystalline, fatty substance which melted at 106°F.; the melting-point was ascertained by placing a beaker containing the substance in a vessel containing water, the water was then carefully heated until the melting-point was reached. The substance is sublimable in prismatic needles and melts before subliming, the odor changing at the same time. It has a slight acid reaction to litmus paper; upon the addition of sulphuric acid it acquires a brown color; with nitric and sulphuric acids, a reddish-brown color, which soon fades; with nitric and hydrochloric acids, a pink color which changes and fades. It is soluble in alcohol, ether and chloroform, partially soluble in caustic alkalies. The reactions indicate it to be a stearopten mixed with a small quantity of oil.

Another portion of the drug was treated with benzol, the percolate was evaporated and the soft extract treated with benzin in order to extract the fixed oil which, when obtained, was of a dark color, insoluble in alcohol, soluble in ether and chloroform, and saponifiable by caustic alkalies. The portion of the extract insoluble in benzin was left in the condition of a powder which was soluble in chloroform and partially soluble in alcohol and ether. The alcoholic solution was evaporated and left a residue of a bitter taste, mostly soluble in water, and precipitated from this solution by solution of tannin. The portion insoluble in alcohol is also insoluble in ether, chloroform and benzol, does not melt upon being heated, but at a higher heat burns to a white ash.

The drug was next treated with alcohol, the percolate evaporated to an extract which was treated repeatedly with water, a portion of the aqueous solution was precipitated with tannin, the precipitate was collected, washed, mixed with oxide of lead and dried, then treated with hot alcohol; on evaporating the alcoholic solution, a residue was left which yielded a yellowish-brown powder having a bitter taste, soluble in ether, alcohol and chloroform; upon the addition of sulphuric acid it acquires a brown color; with nitric acid, a purple color, which soon fades; with nitric and sulphuric acids, a pink color, which changes to purple, then to blue.

Another portion of the aqueous solution was precipitated with subacetate of lead; the precipitate was collected and washed, then suspended in diluted alcohol and freed from lead by means of sulphuretted hydrogen, filtered and evaporated; a dark brown mass, of an acid reaction, was obtained, acquiring with neutral solution of chloride of iron an olive-green color, but not precipitated by solution of gelatin. From reactions made it was supposed to be coloring matter.

By treating the alcoholic extract with benzin, a small quantity of saponifiable fixed oil was obtained, and after treating the extract with water there remained a resinous portion soluble in ether and alcohol.

The drug was next treated with water, the infusion concentrated, precipitated by tannin, the precipitate collected, mixed with oxide of lead and dried; this was treated with hot alcohol and the alcoholic solution evaporated; a yellowish substance, having a slight odor and a pungent taste, was obtained, giving with sulphuric acid a brown color, with nitric and sulphuric acids a reddish-brown color.

A cold infusion, prepared from a quantity of the drug that had not yet been treated with any solvents, was found to contain albumen, but to be free from tannin and gallic acid; it was precipitated with tannin, the precipitate dried with oxide of lead and exhausted with hot alcohol; upon evaporating the alcoholic solution, there was obtained a yellowish-white powder possessing the taste of the drug and soluble in alcohol, ether and chloroform; upon the addition of nitric acid it acquires a pink color, changing to purple; with sulphuric acid, a brown color which acquires an olive-green color upon adding hydrochloric acid. Starch and gummy matter were found in the decoction.

Five grams of the drug were incinerated and yielded ·27 gram of ash, equal to five and four-tenths per cent., of which ·058 gram, equal to 21½ per cent. was soluble in water.

EXAMINATION OF EXTRACTUM GLYCYRRHIZÆ.*

By H. P. Madsen.

The author has examined a sample of licorice, *A*, made at Mequinenza, Spain, which had a very agreeable sweet taste; also six samples, bearing the mark "Baracco," *B* to *G*, and a sample, *H*, prepared by Mr. Piper from licorice root with cold water. Determinations were made of the amount of moisture, ash and matter insoluble in cold water. The aqueous solution was evaporated to ten times the weight of the licorice employed and precipitated by four times its volume of alcohol, spec. grav. ·830; the precipitates were reddish-brown, except *D*, which was very dark, and *A* and *H*, which were of a dark Madeira color. The sugar was determined by boiling with Barreswill's liquid (prepared with 34·639 grams crystallized cupric sulphate, 200 cc. distilled water, 100 grams glycerin, 488 cc. soda solution and distilled water sufficient for 1 liter), filtering quickly, washing with boiling water and calcining the precipitate.

The amount of gum was determined as follows: 10 gram of the extract were exhausted with cold water, the solution was evaporated to 100 grams, completely precipitated by alcohol, the precipitate washed with alcohol, to remove sugar, then dissolved in as little water as possible, and precipitated with cupric sulphate and soda; the albuminates and coloring matter were removed by washing with strong and afterwards with dilute soda solution; the precipitate was redissolved in dilute hydrochloric acid and the arabin precipitated by alcohol. The identity of this precipitate with arabin was proven by the appearance and behavior as compared with arabin prepared from four samples of gum arabic.

The results obtained are tabulated as follows:

	Percentages of						
Samples.	Moisture.	Residue insoluble in water.	Dry Extract.	Extract precipitated by alcohol.	Ash.	Sugar.	Arabin.
A	16·50	17·95	65·55	31·00	12·41	14·48	3·32
B	15·00	25·40	59·60	33·10	9·13	15·17	4·36
C	12·60	25·15	62·25	30·10	6·26	15·11	2·43
D	14·35	21·10	64·55	26·65	6·60	11·09	1·52
E	14·50	34·50	51·00	45·60	6·06	10·09	10·49
F	11·45	26·95	61·60	43·00	14·23	10·82	9·13
G	10·50	37·50	52·00	30·50	6·34	7·33	8·39
H	31·56	traces	68·44	19·00	7·27	12·84	1·19

* Abstract from a pamphlet communicated by the author, entitled "Investigations on Succus Glycyrrhizæ, particularly as regards the amount of gum contained." By H. P. Madsen, Vice President of the Danish Society of Apothecaries. Copenhagen, 1881.

From the results obtained from *H* it is evident that gum must be found in extract of licorice root. The author was assured by the manufacturers that the sample *A* contained no trace of admixture, and the larger amount of gum is doubtless due to the root being exhausted by steam. The samples *E, F* and *G* show such a striking difference from the others that the intentional addition of gum cannot be doubted; it was probably made with the view of giving the licorice a fine appearance, particularly when broken, but the addition makes it useless for pharmaceutical purposes.

The microscopic investigation revealed remnants of cells and starch granules in all samples. The deformed starch granules of *A, B, C* and *D* were probably obtained from the root. *E* contained potato starch, *F* a mixture of wheat and potato starches, *G* starch deformed by heat. *H* contained, besides some remains of cells and deformed starch granules, crystals of sugar.

Insoluble Gum.—The author also describes a commercial gum arabic of fine appearance, which is evidently identical with the gum Savakin described by G. Reimann in "Amer. Jour. Phar.," 1880, p. 155. With 2 parts of water it yielded a consistent glairy liquid which it was nearly impossible to pour out of a bottle; on mixing with more water a sediment of undissolved particles was formed. Heating the gum for several days to 95°C., or boiling it for 48 hours with water, produced no change in this respect; but the gum dissolved readily in lime-water, and the solution could be diluted without producing a precipitate.

The gum was found to contain 5·93 per cent. of water and to yield 3·17 per cent. of ash; the latter contained lime 49·693, magnesia 6·800, potassa 3·400, carbonic acid 40·10 per cent. It will be observed that the percentage of lime is considerable, while there is a deficiency of magnesia and still greater ones of potassa and of water.

NOTE ON THE ANALYSIS OF A MINERAL STATED TO CONTAIN MOLYBDENUM.

BY FREDERICK B. POWER.

Read at the Pharmaceutical Meeting, Dec. 20.

Having been presented a short time ago, through the kindness of Mr. Charles Bullock, with a specimen of a mineral, which, according to those from whom it had been received, was stated to contain molyb-

denum, it was considered of some interest to verify the correctness of the statement by an analysis. This was more particularly the case as the presence of molybdenum in the mineral was at the first contra-indicated by its general physical characters and relatively low specific gravity. The mineral in question is a product of the State of Georgia, and had been sent to this city for the purpose of receiving bids for the same. It is of a light grayish-brown color, quite uniform in structure, and may be readily reduced to powder; when examined under a lens of low magnifying power, it is seen to consist principally of quartz crystals, interspersed with mechanical admixtures of metallic sulphides, which, when isolated, were found to be principally that of iron. A qualitative analysis confirmed the presence of a large amount of silica and iron, the latter in the form of sulphide and oxide, traces of tin, copper and aluminium, with relatively small amounts of magnesium, sodium and sulphur, but with no indication of the presence of molybdenum. In this connection the principal minerals containing molybdenum as an integral and important constituent may be here briefly enumerated: *Molybdenite* or molybdenum disulphide, MoS_2, occurring in the United States in Connecticut and California; *Wulfenite* or lead molybdate, $PbMoO_4$. and more rarely *molybdic ochre*, or molybdenum trioxide, MoO_3, and *Pateraite*, or cobalt molybdate, $CoMoO_4$, but traces of the metal are frequently contained in iron ores, and consequently also found in pig-iron and iron slag. The mineral examined would therefore seem, with reference to the constituents of the portion analyzed, to possess but little or no commercial value, and was not considered of sufficient importance or interest to extend its examination to a quantitative determination of its components.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

The Seeds of Nigella savita.—H. Greenish observed that the fluorescent principle contained in the seeds is soluble in petroleum benzin, and that the seeds cultivated near Moscow contain a smaller proportion of this principle than those grown in Germany. Petroleum benzin dissolves from the seeds volatile oil, the fluorescent body and 35 per cent. of fat, consisting mainly of myristin and stearin, with a little palmitin. On treatment with water, mucilage and albumen was dissolved, together with a dark yellowish-brown principle, soluble in

chloroform, ether and benzol, and resembling ericinon, without, however, being a glucoside. The infusion, particularly if made with acidulated water, contains an alkaloïd, which was obtained as a yellowish amorphous mass, possessing no characteristic color reactions; it is soluble in water, and from this liquid not extracted by agitation with benzin, benzol, carbon bisulphide or amylic alcohol.

The seeds, previously exhausted with benzin and water, yielded to alcohol a little liquid fat and several resinous bodies, of which one, present in small quantities, is insoluble in 70 per cent. alcohol, while the largest portion is insoluble in 40 per cent. alcohol, and on the slow evaporation of its solution may be obtained in radiating needles; these are nearly insoluble in water, ether, benzol, benzin and carbon bisulphide, slightly soluble in chloroform, somewhat acrid, and when the dust is inhaled excite coughing. A few drops of the alcoholic solution added to water produce a foaming mixture. The substance called *melanthin* resembles saponin and digitonin, but more closely parillin, has the composition $C_{20}H_{33}O_7$, and is, on boiling with dilute hydrochloric acid, split into sugar and *melanthigenin*, $C_{14}H_{23}O_2$. Both melanthin and melanthigenin, treated with pure sulphuric acid, acquire a rose color in 15 or 20 minutes, and become violet-red in 15 hours; commercial sulphuric acid containing nitric acid colors yellow, and, on warming, dark violet. The rose-red solution, treated with stannous chloride, turns pale violet and deposits violet-colored floccules.—*Phar. Zeitschr. f. Russl.*, 1881, p. 180.

The seeds of Nigella damascena, which have an agreeable odor of strawberries, yielded to Greenish but traces of melanthin. On being mixed with water the odor disappeared almost completely, and the distillate separated a few drops of oil, having a strong, blue fluorescence, which was particularly noticeable in benzin solution.—*Sitz. Ber. Dorpater Naturf. Ges.*

Salicylic Acid in Violets.—Carl Mandelin has isolated crystallized salicylic acid from the herb of Viola tricolor, var. arvensis by preparing from 90 lbs. of the fresh herb the aqueous extract, treating this with alcohol, evaporating the alcohol, agitating the remaining liquid with ether, treating the residue from the evaporation of the ether with hot water, again agitating with ether and recrystallizing from hot distilled water.

Three other varieties, including one cultivated, were found to contain salicylic acid in the free state and none in combination. It varied

between ·043 per cent. in the cultivated plant and ·107 per cent. in the variety arvensis, calculated for the air-dry herb. The root, stem and leaves contain a comparatively large amount of salicylic acid, the petals only a small quantity and the leaves only a minute trace of it in the free state, but an apparently larger quantity in combination. Reactions indicating the presence of a little free salicylic acid were also obtained with the rhizome of Viola odorata, *Lin.;* V. silvatica, *Fr.;* V. palustris, *Lin.;* V. canina, *Lin.*, and V. arenaria, *DC.* The leaves of V. odorata yielded salicylic acid only after boiling with dilute hydrochloric acid. The acid was not detected in V. uliginosa, *Schrad.;* V. mirabilis, V. uniflora, V. floribunda and V. pinnatifida, *Lin.—Inaugural-Dissertation, Dorpat,* 1881.

The cultivation of Angelica is carried on in France, principally near Clermont-Ferrand, to a considerable extent, the annual average production being 100,000 kilos. The leaves, root and fruit are employed in medicine and for the manufacture of liquors (de la Grand-Chartreuse and imitations); the stalks, which often attain a height of 1·50 meter and a diameter of ·06 meter, are used by confectioners, after the removal of the fibrous layer by boiling them slowly in water, and afterwards repeatedly in syrup.—*Rép. de Phar.*, 1881, p. 519.

Pimento Plantations of Jamaica.—The stems of young pimento trees are largely exported from Jamaica to England and the United States, to be used for umbrella sticks. For the past five years the average annual exportation was 2,000 bundles, while the returns of the first three quarters of 1881 show an exportation of over 4,500 bundles, valued at $15,000. When it is remembered that each bundle contains from 500 to 800 sticks, each of which represents a young bearing pimento tree, the extent of the destruction may be realized.—*Scient. Amer.*, Dec. 31.

Erimocarpus setigerens is extensively distributed in California about the foot-hills and valleys, growing in different soils and flowering through the summer. It is 1 foot or more in height, branched and in tufts, and very wooly and hoary in appearance, the leaves looking almost like white flannel. The flowers are small and unconspicuous and collected in small whorls along the branches. It belongs to the Composite family. Its odor is slight, but to the taste the whole plant is very acrid, particularly the root, the chewing of which leaves an impression on the fauces like that of the well-known Indian turnip. We are informed by Dr. Henry M. Fiske, of San Francisco, that old

residents and natives in the northern part of the State regard it as a curative in rhus poisoning, and also as highly beneficial in certain pulmonary disorders. For the former purpose it is used externally in the form of decoction. The root is preferred for internal use, and is highly valued in cough and pulmonary consumption. Judging from the active sensible properties of the plant, we think it worthy of investigation. Its anti-rhus reputation is probably due to the fact that a thorough washing of the skin with warm water alone soon after contact with the poison or at the first appearance of the effect, will very generally prevent or cure, the efficacy of the washing being enhanced by alkaline or saponaceous fomentations, and very probably by impregnating the liquid with herbs of various kinds.—*Pacific Med. and Surg. Journ.*, Sept., 1881.

Oil of Erigeron canadense.—American oil of peppermint is frequently colored and of inferior quality, which is due to the growth of Canada erigeron in the American peppermint plantations. With the view of detecting the presence of oil of erigeron in oil of peppermint, Ferd. Vigier and Chas. Cloëz have prepared the former from plants grown near Paris, and obtained from the fresh herb 0·7 per cent., and from the root and crown 0·4 per cent. of oil. Fresh peppermint yields only between 0·05 and 0·15 per cent. of oil.

Oil of erigeron is of a yellow color, of a weedy odor and of an acrid burning taste, and in contact with the air oxidizes rapidly, producing a red-brown deposit, resembling in odor that of oxidized oil of orange (Portugal). Most of the oil distils between 175° and 177°C. Rectified at 177° the oil is colorless, very mobile, of a peculiar strong odor, does not stain paper permanently, is not inflammable directly, but thrown upon burning charcoal burns with a sooty flame. It is insoluble in 85 per cent. alcohol, has at 10°C. a density of ·848, a rotating power of $+16·15°$ and the elementary composition of oil of turpentine, $(C_5H_4)_n$. Dry hydrochloric acid gas yields with it a crystalline compound containing 52·51 per cent. HCl. No liquid compound is formed.

Nitric acid reacts violently with oil of turpentine, the elevation of temperature being slight, producing a yellowish viscous resin, which is soluble in potassa with a dark red color and with the formation of potassium oxalate. Sulphuric acid colors the oil black, but the mixture does not completely solidify. The oil does not explode with iodine, and is not colored by chloral hydrate until a drop of hydro-

chloric acid is added, when it becomes green, and on heating, green brown.

Concentrated potassa solution does not saponify the oil, but in the cold colors it orange-red, and on heating produces a red-purple viscous mass. Recently-distilled oil is scarcely colored by potassa until it has become oxidized by exposure. Oil of peppermint, fresh or oxidized, does not give this reaction; in the cold a white emulsion is obtained, and on heating, a slightly yellow mixture.

Oil of peppermint must be considered adulterated if with potassa solution it acquires an orange-red color, yields a turbid mixture with an equal bulk of 85 per cent. alcohol at 15°C., and if it turns polarized light feebly to the left; the rotating power of pure oil of peppermint was found to be between —24·5 and —32·3°.—*Rép. de Phar.*, 1881, pp. 415–420 and 466–469.

Bombay mace, which is occasionally found in the market, according to A. Tschirch, differs from ordinary mace in several respects, and is doubtless obtained from a different species of myristica. The lobes of the arillus are longer and thinner than those of true mace; it is of a dark brown red color, and on the inside has adhering to it a thin parchment-like crumbled membrane, which is never found in true mace. The epidermal cells are radially elongated, narrow and twice as high (those cells of true mace are tangentially elongated and low); their membranes shows the cellulose reaction with iodine and sulphuric acid beautifully, and with zinc chloride and iodine swell and turn faintly blue. The oil cells are very numerous, located near the epidermis on both sides, often close together in groups of two or three, oval in shape, somewhat radially elongated, and contain a dark yellow, usually resinified oil, frequently also brownish resin.—*Phar. Zeitung*, 1881, No. 74.

Phytolacca dioica, Lin., s. Percunia dioica, Moquin-Tandon, is indigenous to Brazil or Mexico, and has been naturalized in Algeria, where trees may be seen having a height of seven or eight meters, and trunks of two to three meters in circumference, having a spongy wood. The berries grow in racemes, are yellowish-green, weigh about one gram and are twelve to fifteen-celled, each cell containing a flattened seed, enclosing a cylindrical embryo, curved around the endo-sperm. According to Balland, the berries, which are sweet and edible, yield by expression seventy-four per cent. of juice, which, after filtration, is

brown, and one hundred parts of this were found to contain of chlorophyll, wax, resin, volatile oil and volatile acid, ·45 part.; glucose, 3·20; saccharose, 11·20; undetermined organic acid, 2·60; gum, 4·40; albumenoids and pectin compounds, ·89; ash, 1·86, and water, 75·40 parts.

The resin is soluble in ether and very acrid, but is present only in minute quantity, like the volatile oil. The volatile acid has an agreeable odor, resembling that of butyric aeid.—*Jour. de Phar. et de Chim.*, Sept., 1881, 232–234.

Adulterated Saffron.—E. Johanson has met with a saffron which was largely adulterated with calcium carbonate tinged with a red pigment, which was not bleached by exposure to sunlight for two days. The powder also contained glucose, probably honey. Pure saffron yields 8 per cent. of ash; the adulterated sample gave 39·15 per cent. —*Reprint from Ph. Zeitschr. f. Russl.*

This adulteration has been observed since about 1870.

PRACTICAL NOTES FROM FOREIGN JOURNALS.

BY THE EDITOR.

Comparison of Poisonous Effects of Metallic Chlorides.—The experiments were made with small fishes weighing 10 grams. Death is produced more rapidly in more concentrated solutions; the limit of poisonous effect was assumed in a solution of the chloride of such strength in 1 liter of water permitting the fishes to live in the liquid for 48 hours. Ch. Richet found the nitrates more poisonous; the sulphates are in many cases too sparingly soluble. The following values were ascertained:

Experiments.	Metal.	Limits.	Experiments.	Metal.	Limits.
20	Mercury,	0·00029	9	Cobalt,	0·125
7	Copper,	0·0033	11	Lithium,	0·3
20	Zinc,	0·0084	20	Manganium,	0·3
10	Iron,	0·014	6	Barium,	0·78
7	Cadmium,	0·017	4	Magnesium,	1·5
6	Ammonium,	0·064	20	Strontium,	2·2
7	Potassium,	0·10	5	Calcium,	2·4
10	Nickel,	0·125	6	Sodium,	24·17

—*Chemiker Zeitung; Comp. Rend.*, xciii, 640.

Preservation of Ferrous Sulphate.—E. Johanson has examined a number of samples of ferrous sulphate prepared in 1866 and 1867, and observed that those which had been kept in vessels merely tied

over with paper were but slighty oxidized, the difference between the total amount of iron and that in the ferrous state being ·09, ·11 and 1·8 per cent. In vessels tied over with waxed paper or bladder the oxidation was greater; in cork-stoppered bottles over one-third of the iron had been oxidized, and in glass-stoppered bottles the salt had spoiled very rapidly. The cause of the more rapid oxidation of ferrous salts in tightly closed vessels seems to depend upon the production of ozone, which from loosely closed vessels is readily diffused into the atmosphere. If a bottle partly filled with ferrous sulphate is closed with a cork to which a strip of paper impregnated with starch and potassium iodide is attached, a blue coloration of the paper will soon be observed.—Reprint from *Phar. Zeitschr. f. Russl.*

Reaction of Oil of Dipterocarpus and Recognition of Mineral Acids in Vinegar.—Armand Jorissen observed a characteristic color reaction of gurjun oil by operating as follows: Place one drop of gurjun oil and 25 drops of glacial acetic acid in a perfectly dry test tube, and add one drop of a very dilute mineral acid, consisting, for instance, of 5 parts H_2SO_4 and 100 parts of water; also 4 to 6 drops of the acetic acid for the purpose of rendering the mixture clear. The liquid at once acquires a rose color, which gradually deepens and becomes of a violet tint, not disappearing on the addition of 30 drops of alcohol, and resembling in color a dilute solution of potassium permanganate.

Oil of copaiba produces under the same conditions a faint rose color, which disappears on the addition of the alcohol.

The above reaction may be used for detecting mineral acids in vinegar. To a mixture of one drop of gurjun oil and 25 drops of glacial acetic acid one drop of the vinegar is added, and after agitation 4 to 6 drops of acetic acid. A mixture of 9 parts of pure vinegar and one part of normal sulphuric acid (containing, therefore, nearly $\frac{5}{1000}$ H_2SO_4) produced the violet color in 7 minutes, and this did not disappear on the addition of 30 drops of alcohol.

No color was produced when operating with vinegar saturated with cream of tartar or calcium sulphate, or with pure vinegar containing one per cent. of sodium chloride, tartaric acid or oxalic acid.—*Jour. de Phar. d'Anvers*, 1881, pp. 233 to 235.

Thymate of sodium was prepared by Tanret, but found to be decomposed on dissolving it in water, while it dissolves in an excess ($\frac{1}{2}$ equivalent) of soda without decomposition. Byasson regards the compounds of thymol or thymic acid with alkalies as not being true salts.

C. Paul regrets that thymol, on account of its disagreeable taste, cannot be given internally, for which reason its combination with soda suggests itself; its action is similar to that of salicylic acid.—*Bull. et Mém. Soc. de Thérap.*, 1881, p. 152.

Petralite, a blasting powder, according to R. Sjöberg, is composed of 60 parts of a mixture in varying proportions, according to the effect to be produced, of nitrocetyl (from spermaceti), nitroceryl (from Chinese wax) and nitroglycerin, 16 parts of potassium (sodium or ammonium) nitrate, one part each of purified spermaceti and calcium carbonate, 6 parts of nitrocellulose and 16 parts of charcoal. —*Chem. Zeitung*, 1881, p. 689.

A permanent aqueous solution of pyrogallic acid, for photographers' use, is recommended by Wortley to be made of salycylic acid 1, pyrogallic acid 10 and water 1,000 parts.—*Ibid.*, p. 692.

Solubility of Sodium Benzoate in Alcohol.—Hager prepared sodium salts with benzoic acid, prepared from the resin in the dry and wet way, from urine and from calcium phtalate. All these salts were found to require 13 parts of alcohol, spec. gr. ·835, for solution at a temperature of 17 to 20°C., the figures obtained for 100 parts of the alcohol varying between 7·5 and 7·9 of benzoate; the difference is due to adhering moisture.—*Ph. Centralhalle*, 1881, p. 435.

Antiseptic and Antizymotic Action of Salicylic Aldehyd.—This compound, formerly called salicylic hydride, and salicylous or spiroilous acid, is contained in herbaceous spiræas, and is prepared by Piria's process, by distilling a mixture of 10 parts of salicin, 10 potassium bichromate, 25 sulphuric acid and 200 water, the oily compound separating from the distillate. Pierre Apéry found that meat may be kept in an aqueous solution of this compound without putrefying, and that a few drops of the oil will preserve urine ("L'Union Phar.," 1876, p. 82).

Since then he has observed that a few drops dissolved in a little alcohol will preserve a corpse for 3 or 4 days, if injected in the carotid artery, or, better still, into the mouth. Dr. Christides has preserved cadavers by such injections made into the buccal and anal cavities. The putrefaction of animal bodies which may still progress in solutions of salicylic acid is totally arrested by the addition of a few drops of salicylic aldehyd. Solutions in glycerin, alcohol and water have been successfully employed as antiseptics, both in private practice and in the war of 1877; and an addition of a small

quantity of it to solutions of zinc acetate has proved very effectual in obstinate cases of blennorrhagia. The high price of this compound is an obstacle to its more extended use.—*Etude sur l'hydrure de salicyle, Constantinople.*

Examination of Pilocarpine and its Salts.—The amount of water of crystallization in three commercial samples of pilocarpine hydrochlorate was found by A. Christensen to vary between 2·97 and 3·78 per cent., and in two samples of nitrate was 1·01 and 1·29 per cent. The former contained 14·5 and 15·0 per cent. of hydrochloric acid and 84·6, 85·5 and 86·9 per cent. of alkaloid; the nitrate yielded 21·1 and 23·7 per cent. of acid, and 76·2 and 78·8 per cent. of alkaloid. For the determination of the latter Poehl's method with phosphomolybdic acid yielded by far too large results; with Mayer's solution volumetric and gravimetric determinations gave incorrect results, and the experiments, consisting in decomposing the salts with NaOH, dissolving in chloroform and titrating with $\frac{1}{10}$ normal acid, indicated that the alkaloid had been decomposed with the formation of an acid body. The above mentioned results were obtained by the gravimetric method with chloride of gold.

The qualitative reactions of the five samples of salts and two samples of hydrate showed no difference in their behavior; but the physiological experiments made by Dr. Podwissotzki showed that four samples (marked *T*) acted similar to jaborine and atropine, while three samples (marked *M* and *N*) acted more feebly, like pilocarpine and nicotine. In the former the presence of the alkaloid jaborine could not be proven, and the author is inclined to assume jaborandi leaves to contain, besides pilocarpine, a second similar alkaloid, and that the different methods employed by manufacturers may yield either one or a mixture of both alkaloids. — *Phar. Zeitschr. f. Russl.*, 1881. Reprint.

Color Reactions of Alkaloids.—Mylius states that the color reactions communicated by Maurice Robin (see this journal, 1881, p. 284) were published by R. Schneider in 1872 (see this journal, 1873, p. 396).—*Phar. Centralhalle*, 1881, p. 400.

Curaçao Cordial.—M. v. Valta communicates the following formula, which is stated to be used by large confectioners: Take of bitter orange (Curaçao) peel, freed from pulp and cut, 15 parts; orange berries, bruised, 15 parts; 90 per cent. alcohol, 190 parts Macerate, strain, and add milk, 10 parts; water, 80 parts. Filter and mix with simple syrup, 50 parts.—*Phar. Zeitung*, 1881, No. 72.

AN INCOMPATIBLE MIXTURE.

By W. Martindale.

Read at the Evening Meeting of the Pharmaceutical Society, Nov. 2, 1881.

The following prescription was placed in my hands by Dr. Paul to investigate the cause and nature of the reactions which occur in preparing it, and to suggest a mode of dispensing it in a condition suitable for the patient to take.

℞	Hydrarg. perchlor., ...	gr. ii
	Potassii iodid., ...	ʒii
	Sp. chloroformi, ...	
	Tinct. cinchonæ, ...	*aa* ℥i
	Quiniæ sulph., ...	ʒss
	Aquæ, ...	℥ii
M.		

The chemist who dispensed it writes: "The prescription is quite a recent one. I was required to dispense it for the first time, and had not long to think about it. My mode of mixing it was to dissolve the perchloride in the spirit of chloroform, then adding the iodide of potassium (in solution), the tincture, and finally the quinine rubbed down with the remainder of the water. Immediately there commenced to form a brownish flocculent precipitate, a portion of which, on shaking, adhered to the side of the bottle, and the whole of the bark seemed to be separated, forming a tenacious, insoluble mass, a portion of which I took out and put into my mouth. It stuck to my teeth and gums something like what I should expect bird lime would, and tasted bitter and of the chloroform."

Mix it as you will you get the same results. If the iodide and perchloride be dissolved in the water and this solution added to the other three ingredients, the quinine not being reduced to powder, less aggregation of the precipitate takes place at first than when mixed as before described; but in a little time or a very slight elevation of temperature, such as a warmer day, the precipitate all coheres at the bottom of the bottle. To free it from complication I dispensed it with proof spirit *vice* tincture of cinchona; a dense oily layer then sinks to the bottom of the bottle, and there is very little

powder left floating in the supernatant liquid. Pursuing further, I omitted the perchloride of mercury as well as the bark; an almost complete solution is then obtained. The iodide of potassium helps to dissolve the sulphate of quinine without, it is stated, double decomposition occurring, as there is much less insoluble matter left than when the iodide also is omitted from the mixture. In place of omitting the perchloride of mercury I next omitted the iodide of potassium; this gives a mixture containing a quantity of flocculent precipitate of the double salt, chloro-mercurate of quinine, with an excess of sulphate of quinine. Then I dispensed the mixture without the chloroform, using rectified spirit *vice* spirit of chloroform, and proof spirit *vice* tincture of cinchona as before. The result was a soft resinous deposit, not oily, but in other respects like that containing the chloroform. Omitting the spirit and tincture both, merely using the salts, rubbing the quinine with a little water, and adding the perchloride and iodide mixed in solution, the result was, as one would suppose, a mixture containing a flocculent, curdy, white precipitate, readily diffusing itself through the mixture on agitation.

On looking at the prescription one perceives that the potassio-mercuric iodide formed would act as a precipitant to quinine as well as other alkaloids, if present. Iodo-mercurate of quinine, a salt which, so far as I know, has not yet been described, or some compound of iodoquinine, is probably here precipitated in the presence of excess of sulphate of quinine in a weak alcoholic fluid containing also chloroform. The alcohol renders the precipitate viscid, and the chloroform, having greater affinity for it than the weak alcoholic solution, combines with and dissolves this precipitate and the sulphate of quinine, and forms an oily deposit. The prescription is thoroughly incompatible, but not so incompatible but that with an addition the difficulty may be overcome. I first tried mucilage of acacia, using 1½ fluidounce in place of the same quantity of water. On rubbing the quinine in a mortar with the mucilage, adding gradually and stirring during the addition the iodide and perchloride previously dissolved in ½ ounce of water, pouring these into the bottle, adding the tincture, and lastly the spirit of chloroform, and shaking well, a presentable but not an elegant mixture is obtained. It is too alcoholic to hold in complete solution the gum, which forms a clotty deposit,

and requires to be shaken to diffuse it, but the mucilage emulsifies the oily sediment which would have formed without its addition.

I next tried glycerin, in the expectation of having the precipitate held in solution, using $1\frac{1}{2}$ fluidounce in place of as much water as before. The sulphate of quinine was rubbed with the glycerin, the iodide added, then the tincture of cinchona and spirit of chloroform, lastly, the perchloride of mercury dissolved in $\frac{1}{2}$ ounce of distilled water. No precipitate is formed except what is immediately redissolved. The mixture is only slightly opaque, owing to some of the resinous matter of the tincture of bark separating. The addition of glycerin answers better than that of mucilage, and its sweet taste would scarcely be noticed in the presence of spirit of chloroform. Both additions are so harmless that the dispenser would be justified in using either, letting the prescriber know he had done so afterwards, supposing personal communication with him previously to be impossible. As prescribed, the two most important ingredients in it, the mercury and quinine, are presented in such a form as to render it impossible to divide them into doses for the patient to take. All the mercury the mixture contains might be poured into one dose and prove highly detrimental or even fatal.—*Phar. Jour. and Trans.*, Nov. 5, 1881.

AN INCOMPATIBLE MIXTURE.

By A. W. Gerrard, F.C.S.

Read at the Evening Meeting of the Pharmaceutical Society, Nov. 2, 1881.

Nearly two years ago I was informed by a gentleman who had been staying at Hastings that a prescription dispensed for him in that town, and which was colorless when freshly prepared, became almost black after standing a week or two. The ingredients were, so far as he could remember, as follows:

℞	Sodæ salicylat., ...	gr. xv
	Spt. æther. nitros., . . .	♏xv
	Aquæ camph., ...	℥i

The combination is evidently one which might readily suggest itself to any prescriber as well suited for a rheumatic affection, and not likely to go wrong as regards compatibility.

An explanation of the occurrence being asked, I could not give one, but promised to give the matter my attention.

A 2-ounce bottle of the mixture was prepared in the quantities indicated, and exposed to the strongest light of my dispensary. The mixture, at first colorless, after standing 24 hours showed a distinct dark tinge, which gradually increased until at the expiration of two weeks it was almost black, and contained a black deposit. The odor of the mixture had also changed; instead of smelling of nitrous ether it was suggestive of oil of wintergreen. I now prepared the same mixture, minus the camphor, and the decomposition was the same; thus the camphor was not considered to be an element in the change, and omitted from future experiments. Another and concentrated mixture was made, containing 1 part each of nitrous ether, salicylate of soda and water; the change was the same, but the color and odor, as would be expected, was intensified. The application of heat very much facilitated the change, producing a reddish-brown color, but no blackening, the latter color appearing to be dependent on long exposure to light.

A consideration as to the decompositions which might bring about the changes referred to has led me to believe that salicylate of ethyl is the chief product, this body possessing an odor and other properties analogous to salicylate of methyl or oil of wintergreen. If this be so, the decomposition may be represented by the following equation:

$$\underset{\text{Soda Salicylate.}}{C_6H_5NaCO_3} + \underset{\text{Ethyl Nitrite.}}{C_2H_5NO_2} = \underset{\text{Ethyl Salicylate.}}{C_6H_5C_2H_5CO_3} + \underset{\text{Soda Nitrite}}{NaNO_3}.$$

That there are other and more complex changes is made evident by the color of the mixture. Of these I have no knowledge; but knowing the mixed character of spirit of nitrous ether of commerce, and that it contains nitrous acid and aldehyd, it may be expected that these bodies will play an active part in this novel and interesting example of incompatibility.—*Phar. Jour. and Trans.*, Nov. 5, 1881.

NOTE ON SALICIN: ITS SOLUBILITY AND DECOMPOSITION BY HEAT.

By R. H. Parker.

Read at the Evening Meeting of the Pharmaceutical Society, *Nov.* 2, 1881.

The solubility of salicin (and of many other bodies) in water varies according to the conditions under which it is observed: (1) whether the substance be finely powdered and agitated in various proportions with the solvent, complete solution after a given period of time at

60°F. being taken as the solubility; (2) whether the substance be added in excess to the solvent, the mixture being filtered and a known proportion of the filtrate evaporated and weighed; or, (3) whether the substance be dissolved in various proportions by heat, and the point of crystallization observed as indicating the result sought. The first method is most reliable. In the second case the substance (especially if organic) may not be in the same condition, when dissolved and evaporated to dryness, as before such treatment; moreover a correction is necessary for the increase in volume on addition of the solid substance. The third method is least accurate, as a supersaturated solution may remain clear; but when crystallization has commenced, it will probably continue until the solution is much weaker than a cold saturated one. The difference of a few degrees of temperature is of little importance except when, by the first method referred to, the observation is extended over a long period.

In Storer's "Chemical Solubilities," various observers are quoted giving very discordant results, viz.: "One part of salicin dissolves in 17·85 of water at 19·5°C.; in 14 at 17°C.; in 30·31 at 11·5°C.; in 28·57 at ordinary temperatures; in 22 cold and ·5 hot water; in 6 at 18·75°C.; in 5·6 cold and in much less boiling water." The two last mentioned may be misprints for 16 and 15·6, or else intended for 6 parts and 5·6 respectively soluble in 100 parts of water.

During the last few days I have made the following observations:

Salicin in water 1 in 20, finely powdered and agitated at short intervals for twelve hours at 60°F., left much undissolved, remaining so for several days; 1 in 20 dissolved by heat and filtered, gave a trace of crystals in five hours at 60°F., more after twelve hours, and a large increase on standing.

Salicin in water 1 in 24, cold as last experiment, left less undissolved after twelve hours at 60°F., and did not dissolve entirely after several days; the same dissolved by heat and filtered gave a minute trace of crystals after six hours at 60°F., which did not increase on standing.

Salicin in water 1 in 28, cold as before, left a trace undissolved after twelve hours at 60°F., which finally disappeared; the same dissolved by heat showed no tendency to crystallize.

Parallel experiments, using a 10 per cent. aqueous solution of glycerin instead of pure water, indicated that the presence of this body lessened the solubility rather than otherwise, 1 of salicin in 24 giving a large crop of crystals after twenty-four hours.

Finally, four experiments were very carefully instituted, using analytical weights and bulb and scale pipettes, the correct relation of which to the weight used had been demonstrated. The following solutions were made:

1 gram of salicin in 23 cc. of distilled water.
1 gram of salicin in 25 cc. of distilled water.
1 gram of salicin in 23 cc. 10 per cent. solution of glycerin.
1 gram of salicin in 25 cc. 10 per cent. solution of glycerin.

All were dissolved by heat at the same temperature, each filtered until perfectly free from floating particles, and set aside. After twenty-four hours, although the temperature had fallen to about 53°F., all were perfectly bright. But on dropping a minute crystal of salicin into each bottle, both the aqueous and glycerin solutions 1 in 23 became cloudy in half an hour, from the appearance of crystals; that containing glycerin more so, giving a very abundant crop in another twenty-four hours; the crystals in the aqueous solution did not increase much in that time. Both the 1 in 25 solutions remained bright after the second twenty-four hours.

The solubility of salicin in water at ordinary temperatures may therefore be taken as 1 in 28 for cold solution, 1 in 24 if previously dissolved by heat. For dispensing purposes, of course the lower solubility, 1 in 28, must be taken as the standard.

The Decomposition of Salicin on Heating with Glycerin.—1 drachm of salicin, finely powdered and triturated with 1½ drachm of glycerin, transferred to a test-tube containing a thermometer and gradually heated, dissolves without apparent decomposition at about 300°F.; if diluted to 2 ounces with water, a colorless solution is obtained, crystallizing abundantly on cooling.

Heated beyond 300°F., the mixture of salicin and glycerin boils, rapidly acquires a brown color and an odor of caramel; if now diluted a brown solution with burnt odor is obtained, which also crystallizes abundantly on cooling.

The same proportion of salicin and glycerin, heated for half an hour to 500°F., continues to boil, gives off water and suffocating vapors (partly due to acrolein) and the vapor of salicylol, the liquid becomes deep red-brown but remains transparent at 500°F.; it becomes opaque at 460°F., and solidifies on cooling. Warmed with water to two ounces, it became milky and a large amount of brown matter

rapidly separated, aggregating to a resinous mass, which was brittle when cold. The aqueous solution was filtered; the yellowish filtrate did not crystallize on cooling, did not reduce Fehling's solution before ebullition with dilute acid, but did so afterwards, proving absence of glucose and presence of undecomposed salicin. The precipitated resin, washed with hot water, was readily soluble in warm rectified spirit, forming a red-brown tincture, rendered milky by addition of water; readily soluble in solution of potash and thrown out by HCl as a brown precipitate which did not aggregate, and was readily redissolved by cold spirit or solution of potash.

I purpose investigating the nature of this resinous body more fully at a future date. These notes, however, show that at a temperature exceeding 300°F., salicin is decomposed, yielding a brown resin, water, salicylol and other bodies. Salicin submitted to dry distillation yields similar products; it is therefore probable that the glycerin exerts no further influence than that of controlling the temperature.—*Phar. Jour. and Trans.*, Nov. 5, 1881.

ESTIMATION OF THE AMYLOLYTIC AND PROTEOLYTIC ACTIVITY OF PANCREATIC EXTRACTS.

By W. Roberts.

The term *ferment* has hitherto been applied to two groups of agents which, although nearly allied in origin and mode of action, nevertheless belong to essentially different categories. The *organized* or *formed ferments*, of which yeast is the type, are independent organisms with powers of growth and reproduction, and the transformations which constitute their special characteristics as ferments are inseparably associated with the nutritive operations of these organisms. The ferment power cannot be separated from the ferment organism by any method of filtration or by any solvent. The *soluble ferments*, on the other hand, pass freely into solution in water; their action is dissociated from the life of the gland-cells which produced them, and they are wholly devoid of the power of growth and reproduction. The author, following Kühne, designates these soluble ferments as "enzymes," and further proposes to designate their action as *enzymosis*, and its nature as *enzymic*.

The pancreas is the source of two ferments or enzymes of capital importance in the digestion of food, viz., an amylolytic enzyme

called *pancreatic diastase*, and a proteolytic enzyme called *trypsin*. The pancreas also takes an important share in the digestion of fats; but whether this power is due to an enzyme or to an agent of different character is a question not yet determined. The present paper concerns itself solely with the amylolytic and proteolytic functions of the pancreas.

Estimation of the Amylolytic Activity of Pancreas Extracts: Diastasimetry.—The method adopted by the author for this purpose consists in ascertaining the quantity of starch-mucilage of known strength which can be transformed by a unit-measure of a diastasic solution to the point at which it ceases to give a color reaction with iodine in a unit of time and at a fixed temperature. The vanishing point of the color reaction is called the *achromic point.*

The amount of amylolytic work which can be done, or, in other words, the amount of standard starch-mucilage which can be brought to the achromic point in a given time by a given sample of pancreatic extract is exactly proportional to the quantity of the extract employed, provided the products of the enzymosis do not accumulate in the solution to such a degree as to interfere with the action, which will not be the case if the starch-mucilage used is sufficiently dilute. The mucilage used in the author's experiments was of the strength of 1 per cent. This law of proportionality may perhaps be regarded as applicable to the action of all enzymes which, indeed, having no power of growth or multiplication, conform in this respect to the law which governs the action of ordinary chemical agents.

The fundamental rule governing the relations of quantity and time in the action of an enzyme is that of *inverse proportion*, that is to say, a double quantity of an enzyme will do a given amount of work in half the time, etc. This rule, however, is apparently modified by another, namely, that *an enzyme liberates its energy at a progressively retarded rate.* In regard to the action of pancreatic extract upon starch-mucilage, the rule of inverse proportion between quantity and time was found to hold good within considerable limits, as shown by the following table giving the results of experiments in which 10 cc. standard starch-mucilage of the strength of 1 per cent. diluted with water up to 100 cc. was subjected to the action of pancreatic extract at a temperature of 15°. The "calculated" time in the third column was obtained by taking the middle observation of each set as a standard of comparison.

	Quantity of pancreatic extract employed.	Time in which the achromic point was reached. Found.	Calculated.
I.	0·02 cub. cent.	34 minutes.	36 minutes.
	0·04 "	18 "	18 "
	0·08 "	9 "	9 "
	0·10 "	7 "	7½ "
	0·20 "	3 "	3½ "
II.	0·4 "	4¾ "	5 "
	0·2 "	10 "	10 "
	0·05 "	40 "	40 "

In both these sets of observations the inverse time rate comes out with a very near approach to exactness. When, however, only a relatively small quantity of pancreatic extract was employed, the attainment of the achromic point was postponed beyond the term indicated by the rule. Thus, when 0·004 cc. of the extract was employed the achromic point was reached in 125 minutes; consequently, with 0·0005 cc. extract the time should, according to the rule, have been 1,000 minutes, but it was actually 1,380.

Influence of Temperature.—The action was found to increase in energy (or speed) from 0° to 30°, thence to 45° it continued steady; above 45° it became less and less energetic, and finally ceased between 65° and 70°.

Comparative Diastasic Values of different Pancreatic Extracts.—The diastasic value of an extract is expressed, in the author's system, by the number of cubic centimeters of standard mucilage, which can be brought to the achromic point by 1 cc. of the extract to be tested in five minutes at a given temperature. By this mode of estimating, the author found that the extract obtained from the pancreatic tissue of the pig has at 40° a mean diastasic value of 100, those of the ox and sheep at the same temperature having the values 11 and 10 respectively. Filtered human saliva has a diastasic value of 10 to 17 at 40°, and its energy varies with the temperature in exactly the same manner as that of pancreatic extract (p. 1052). *Malt diastase* has a diastasic value of 4 to 5 at 40°, increasing to 10 at about 60°, above which it diminishes, but does not cease entirely until the temperature is raised to 80°. Several specimens of human urine showed a diastasic value of 0·03 to 0·13 at 40°.

Proteolytic Activity of Pancreatic Extracts.—Trypsimetry.—Milk digested with pancreatic extract acquires the property of curdling when boiled. The onset of this reaction occurs earlier or later according to the activity of the extract, and the quantity of it employed; and the time of its advent may be fixed with sufficient accuracy to serve as the basis of the method of measuring the proteolytic activity of pancreatic

extracts. The reaction in question depends on the production, as a first step in the digestion of caseïn, of a modified form of that body—termed by the author "metacaseïn"—which resembles caseïn in being curdled by acetic acid in the cold, but differs from it in being curdled also by simple boiling. These two reactions together distinguish metacaseïn from all other proteïds. The property of curdling when boiled, which may be called the *metacaseïn reaction*, continues observable in milk undergoing tryptic digestion until near the end of the process; it then disappears somewhat abruptly, the milk remaining fluid when boiled. We may therefore speak of the *onset-point* and the *vanishing-point* of the metacaseïn reaction, these two points marking respectively the initial and terminal limits of the principal phases in the digestion of milk by pancreatic extract. Before, however, the onset-point of the reaction, *i. e.*, distinct curdling, is attained, its approach is indicated by an appearance of soiling of the sides of the test-tube in which the milk has been boiled. This appearance is due to incipient coagulation, which presently develops into pronounced curdling.

When milk is diluted with water, the occurrence of the metacaseïn reaction is postponed, the time of postponement varying with the degree of dilution.

The method of trypsimetry adopted by the author consists in ascertaining how many cubic centimeters of milk can be brought to the onset of the metacaseïn reaction in five minutes by 1 cc. of the extract to be tested at a given temperature, attention being paid, as in the case of disastase, to the relations of tryptic action to quantity, time and temperature.

The rule of inverse relation between quantity and time, which was found to be valid within a wide range in the case of disastase and starch, holds good in the case of tryspin and milk within narrow limits only. When the time of action exceeds eight or ten minutes the advent of the metacaseïn reaction is postponed beyond the term indicated by the rule of inverse proportion, and this postponement increases as the time of action is lengthened. When the vanishing-point of the metacaseïn reaction is taken as the point of comparison, the results approximate more nearly to the rule of inverse proportion, especially at low temperatures; nevertheless the evidence points in the same direction, indicating that tryspin, like diastase, exhausts itself in action at a progressively retarded rate. When the onset-point of the reaction falls between three and six minutes, the inverse time-rate gives a trustworthy basis of calculation, but not beyond these limits.

Tryptic enzymosis is exceedingly sensitive to temperature. The action of trypsin on milk increases in energy from 0° to 60°, but above this point there is a rapid fall, the action being finally arrested between 75° and 80°. There is not, as with disastase, any range or platform of indifferent temperature.

The following table shows the enzemic values of twelve samples of pancreatic extract prepared with single glands from four pigs, four oxen and four sheep, killed for the market. All the observations were made at 40°. D stands for diastasic, T for triptic value:

Pig.			Ox.			Sheep.		
No. 1.	D=166	T=64	No. 5.	D= 8	T=64	No. 9.	D= 5	T=125
No. 2.	D=100	T=83	No. 6.	D=10	T=50	No. 10.	D=12	T= 83
No. 3.	D=100	T=72	No. 7.	D= 9	T=42	No. 11.	D=14	T= 64
No. 4.	D=100	T=64	No. 8.	D=13	T=83	No. 12.	D= 4	T= 28

The oscillations in the two enzymic values do not exhibit any regular relation to each other.

The most appropriate standard of temperature for the valuation of tryptic activity is 40°, as it corresponds very nearly with the temperature at which trypsin operates in the normal digestion of warm-blooded animals; but it is more convenient to perform the testing at or near the ordinary temperature of the room, say at 20°; and the author has ascertained that the values of T obtained at this temperature may be converted with sufficient accuracy into the corresponding values at 40° by multiplying them by 3·5.—*Jour. Chem. Soc.*, Nov., 1881; *Proc Roy. Soc.*, xxxii, p. 145.

ON RED BARK.

By John Eliot Howard, F.R.S., F.L.S.

Read before British Pharmaceutical Conference.

In order to present more definitely the results of recent information on this subject, together with some suggestions for discussion at the Conference, I must, in some sense, begin at the beginning, and show what I mean by "red bark."

The limitation of the genus Cinchona to those plants which have capsules dehiscent from the base towards the apex seems to me most correct and natural. I think my friend, Prof. Karsten, has done good service to quinology, not only by the magnificent and unique plates and descriptions in his splendid volumes of the *Cinchona cordifolia* and *C. lancifolia* (for instance), but also of the lesser known group which he includes, to my regret, under the same head of cinchonas (*Cinchona, sectio Heterasca*).

These have capsules variously dehiscent, though in other respects closely

allied to the cinchonæ. I have recently met with specimens of the bark of two of these, together with leaves, and, in one case, very well preserved capsules, evidently of the *Cinchona pedunculata*, Karsten; the other I referred, with less certainty, to another of his species, *C. undata*, Krs.

I was informed that neither of these barks, when examined by Dr. Paul, manifested any trace of alkaloid. Is not this a reason (if confirmed) for the limitation of the term cinchona to those plants which, having the capsules dehiscent from the base, also possess the medicinal properties from which the name is derived? To these alone it seems properly to belong.

When we come to the definition of species the difficulty of discrimination increases so much that some (even of those who are interested in the cultivation) seem inclined to throw up the whole subject in despair, and to believe in unlimited hybridity and change instead of that exact fixedness of type which, at all events since the researches of the early Spanish botanists, have marked the South American species. Pavon, especially, was very careful in his selection of specimens, so that out of forty-one sorts which I possess of his collection I am able to recognize at least twenty-eight as met with in commerce, and as like as if they came off the same trees.

I have thus found amongst the barks of commerce the bark of most of the species described by Pavon and his associates, and by Mutis and Zea, exactly reproduced with every minute feature. I have had the satisfaction of cultivating many and of receiving specimens from the native habitats and the adopted countries of many others, and my conclusion is that fixity of type is the rule, and variability the exception. I do not deny that this latter occurs (through hybridity) in India, but I agree with the late Dr. Weddell in thinking that there is not usually much opportunity for this in South America. I can add that Dr. Weddell's specimens are admirably true to type.

Even in India the probability is that many of the variations observed are connected with the following characteristics, observed first by the Spanish botanists, and which I will now briefly explain.

All the different species of cinchona, so far as observed, exist under different, slightly varying *forms*, of which it seems impossible to say that any one is the original species and the others varieties. For instance, I have now, growing from seeds gathered by the diligent collector, Robert Cross, two forms of the *Cinchona cordifolia*, from two different localities, one of which, from a place called Coralis Inza, possesses the true cordate form of leaf as represented by Karsten in his plate of *Cinchona cordifolia;* the other, though equally in its marked characteristics the "hard Carthagena" or "cordifolia" bark of Mutis, does not yet show one leaf true to the type. The Coralis Inza form is much richer in quinine, and has consequently (at my recommendation) been transplanted by Mr. Cross to India, where I hope it may prosper and perhaps be found useful.

Having premised these observations, I now come to the question of "red bark," of which the true species is, as defined by Pavon, the *Cinchona succirubra*, so named by this botanist from the peculiarities of the *juice*, which he defines as follows:

"In arboreum corticumque amputatione succum lacteum primum pro-

fluit; postea in colorem intense rubicundum transmutatur, unde *cascarilla colorada* nomen oritur."

That is to say, it is named "Red Bark" (in Spanish as above) from this peculiarity in the juice. True red bark is, as I have shown in my "Illustrations of the Nueva Quinologia," the product of *Cinchona succirubra* of Pavon. But *C. succirubra*, like other species, exists under somewhat different forms, as will be seen by examination of the specimens I send to illustrate the subject.

One source of variation is connected with the *macho* and *hembra* forms of the same plant; that is to say, the preponderance of the male and female elements in the flower, attended, as well shown by Dr. Weddell, with corresponding changes in the rest of the plant. The color of the flowers, for instance, varies in its intensity. Another contrast between different forms is found in the perfectly glabrous or subpubescent under surface of the leaf. This, as defined by Pavon, and as found generally in India, is perfectly smooth. As defined by Klotzsch, it is *foliis subtus puberulis*, judging, as he did, from a specimen of Pavon's in the Berlin Museum.

These differences, apparently trivial, are nevertheless important to the cultivator. The pernicious effects of the rapid oxidation of the cinchotannic acid I have explained in the "Nueva Quinologia," so that we may fairly say the more truly *colorada* or *red* the bark, the less probability there is of good results in the alkaloids. I send for the Museum small specimens (A) of Pavon's own collection; of the genuine Red Bark (B) in commerce, and of the more resinous sort (C), which I have described in the above work, as they used to be imported from South America, fetching a high price, but useless to the quinine manufacturer, containing in each case about 2 per cent. of alkaloids, the most predominant cinchonine and cinchonidine. The truest red bark in India will come to this by age. The state of degeneration which I have described (at p. 14, *sub voce C. succirubra*) was believed, by Mr. Broughton, to have set in during the continuance of his observations, and I have recently had the opportunity of examining specimens, carefully selected by Mr. Cross from the Government Gardens at Ootacamund, which present the much more mature bark as exhibiting the true characteristics of genuine Red Bark, both in physical characteristics and in the nature of the alkaloids it contains.

I have forwarded specimens of these (D), No. 19 and 20, as sent by Mr. R. Cross, with the following information:

Analysis of No. 19.—Quinine ·91 per cent.=sulphate of quinine 1·21 per cent. Cinchonidine 1·43 per cent. Cinchonine 3·84 per cent. Amorphous alkaloid 1·14 per cent.

Analysis of No. 20.—Quinine ·86 per cent.=sulphate of quinine 1·15 per cent. Cinchonidine 2·08 per cent. Cinchonine 3·66 per cent. Amorphous alkaloid 1·06 per cent.

On these barks I have remarked thus in a recent report to the Marquis of Hartington:

"Both these are most characteristic specimens of Red Bark, and the produce well illustrates the mistake, which I have constantly pointed out, of the excessive cultivation of this species. The bark of such trees can

only be made serviceable by '*renewing*'; otherwise the oxidizing process goes forward to the ultimate destruction in old trees of almost all the alkaloids."

In the same report I have particularly contrasted with the above Mr. Cross' No. 18 (E), as follows:

"Under No. 18 I find valuable information. This is called 'Red Bark,' but is, indeed, not Red Bark at all, but, as described by the Spanish botanists, 'cinnamon-colored bark' (*acanelada*). According to these authorities, when the trunk is wounded a clear juice flows out, which changes to a *golden color*." (See my "Nueva Quinologia," under head of *C. coccinea, vulgo cascarilla serrana acanelada, y Pata de Gallinazo.*)

"*Truncis incisis, succum crystallinum exudant, posteaque in aureum colorem convertitur.*

"Under similar circumstances the *C. succirubra* yields a milky juice, which changes to an intensely red color. . . . It is rightly named by Cross, *Pata de Gallinazo.*"

I published information on both these barks in 1862, and my work was sent out by the government to, I suppose, all the stations; but apparently we have these *two* species still united under the designation of *C. succirubra*. I know not to what extent the species prevails in India, but it is satisfactory to believe that it is a much better sort for cultivation than that with which it is confounded, as is shown by the following analysis of (E):

Quinine 2·27 per cent.=quinine sulphate 3·03 per cent. Cinchonidine 3·21 per cent. Cinchonine 3·17 per cent. Amorphous alkaloid ·93 per cent.

But we have not only *two* but *three* species confounded under the heading of *C. succirubra*, as I have convinced myself by comparing together the specimens which I send, together with information from Mr. R. Spruce, the collector of the seeds for India, also from the late Mr. McIvor, and from examination of specimens of bark from India, and also quite recently from St. Thomas.

This is the *cuchicara* or "pig's skin sort" of Red Bark, little valued in commerce of old, the appearance being against it, but apparently of greater value than the true Red Bark as regards contents in alkaloid. See specimen (F) and analysis.

Analysis of Bark from St. Thomas.

	Quinine sulph. Per cent.	Quinine. Per cent.	Cinchonidine. Per cent.	Cinchonine. Per cent.	Amorph. Per cent.
Large quills,	2·86	2·14	3·26	2·49	·89
Medium quills,	2·31	1·73	3·16	2·28	·91
Small quills,	1·83	1·37	2·00	1·34	1·00

I will give in an Appendix the remarks written by Mr. Spruce himself on inspection of the *C. erythrantha* of Pavon (as represented in my illustrations of the "Nueva Quinologia"), which he says is probably true cuchicara.

According to Spruce, the *C. conglomerata* and *C. umbellulifera* of the "Nueva Quinologia" are probably allied species.

The propagation of so many millions of trees of what is called *C. succirubra* in India, against all cautions and in neglect of all the information I have been able to reproduce from the careful Spanish botanists, impresses

on my mind very strongly the inquiry, *cui bono*, as to any information I am giving now and might be able to render hereafter.

I reflect, however, that amongst the private cultivators there are some who gladly avail themselves of the best scientific information they can obtain, and who will find in the end that they have done well to attend to the careful discrimination of the species, and in giving their attention to the cultivation only of those most adapted to their purpose.

From the observations of Mr. Spruce, I do not suppose that it is easy for an unpractised eye to discriminate between these species when not in flower; but Mr. Cross writes to me that he alone saw the tree in its native *habitat*, and collected the plants at the foot of a precipice when in company with the son of a cascarillero. It is, at all events, rather late now to attempt any separation. The seed of the different species has been put by the collectors into the same bags, so that all is uncertainty. The Jamaica sort seems to me to represent very perfectly the subpubescent type of the true *C. succirubra*, according to the specimen described by Klotzsch. It is, moreover, richer in alkaloid than the average Red Bark of the East Indies, which, for the most part (but not without exception of better qualities), must belong to the glabrous type.

I have, now growing, a plant of a kindred sort, the *var. pubescens* of McIvor, and am not disinclined to think that it may be, after all, one of the cognate species as mentioned above, instead of a hybrid. If I can succeed in getting it to flower I shall perhaps be able to solve the question.

Prof. Trimen, Director of the Royal Botanic Gardens, Ceylon, says in Report for 1880:

"I have also received from the Government Plantation at Nediwuttum, Nelgiris, a Wardian case with some young plants of the kind called[1] *C. officinalis, var. pubescens* by Mr. Howard, but considered a hybrid by the late Mr. McIvor. Owing to the remarkably careless packing these were nearly all dead on arrival, but a few have survived and are doing well. They possess much the appearance of *C. succirubra* at present."

I am informed by a private cultivator in Ceylon that it forms a handsome tree, differing in its mode of growth from *C. succirubra.* (See Appendix.)

Another planter tells me he has of this sort, which he identifies with the tree in my possession, not less than 300,000 plants in various stages, from which he expects great results.

I must now draw to a conclusion this, I fear, rather prolonged paper by suggesting as a subject for discussion, What is the difference in therapeutic efficacy between pharmaceutical preparations of *C. succirubra* and *C. officinalis?*

It is probable that in future these will almost exclusively be made from the barks grown in India, and at present the former seems to be the most recommended.

I cannot believe that the medicinal effect will be the same in both cases. I have before stated that the astringent principle shows an entire diverg-

[1] I simply suggested it being called "*var. pubescens*," looking upon it as a *hybrid*. It is quite unlike *C. officinalis*. It would be better to call it (simply) "Howard's sort."

ence in the two different barks, as tested by different reagents. I am not aware that either in one case or the other any medicinal inquiry has taken place. The same observation may be made as to the remaining constituents of the *C. succirubra* and the *C. officinalis*, in the former case much more complicated than in the latter.

The supply of cultivated bark from South America will probably go entirely into the hands of the quinine manufacturers. This may also be the case with the best of the *C. officinalis*, but much of what is cultivated is of an inferior description.

I will not add anything respecting the relative constituents in alkaloids, but conclude with an observation of Lord Bacon (quoted by Dr. Kentish, one of the early writers [1784] on Peruvian bark), that mankind are far too apt to contemplate nature as if from the top of a tower, without descending to the investigation of details.[1]

Practically, however, the substitution of theory for scientific investigation is sure to lead to very unsatisfactory results.

In the present instance we have the following confusion:

When "Red Bark" is spoken or written about, it may be the produce of

(A). *C. succirubra.* α. Glabrous form. β. Subpubescent form, or—

(B). *C. coccinea*, Pavon (?). *Pato de Gallinazo*, or—

(C). "Pubescent" sort of Howard, or—

(D). *C. conglomerata*, Pavon, *casc. colorada*, producing, according to Cross, the *morada* sort of Red Bark, of which I send specimen [G], or—

(E). *C. erythrantha*, Pav. (?), *casc. cuchicara.*

APPENDIX.

[*Remarks written by R. Spruce on my Quinologia.* "*Notulæ ad Quinologiam novam Spectandæ, R S.*"]

Cinchona.

"*C. coccinea*, Pav., *Pato di Gallinazo* (Ecuador).—Plainly the true *Pata di Gallinazo* of the Quitensian Andes, and seen by me in the very same localities (Chillanes, Guaranda), also in valleys of Pallatanza and Alausi. I could not distinguish it by the leaves alone from the *Cuchicara* growing along with it, but the Indians say they can always tell it. Its bark has some commercial value, that of the *cuchicara* none. The two agree in the very stout leaf veins, the corymbose inflorescence and the *dull scarlet* or *brick-red color of the flowers*, quite different from the red or roseate hue of the flowers of most other cinchonæ.

"*C. erythrantha*, Pav., compared with the *Pata di Gallinazo* by Pavon himself, is probably *true cuchicara.* The *acute venation* and the locality (hill forests of Guayaquil and Jaen) seem to confirm this view.

"*C. conglomerata*, Par.—Except for the elongated panicle, this much resembles a pubescent form of the *cuchicara.*"

[*Extract from "Nueva Quinologia," C. succirubra*, p. 14.]

"In the red bark it is to be remarked that the brick-red color, which as Ruiz observes, is not found in the growing plant, but in the dried bark, is

[1] Solent autem homines naturam tanquam ex præaltaturri et à longe despicere, et circa generalia nimium occupari: quando, si descendere placuit, et ad particularia accidere, resque ipsas attentius et diligentius inspicere, magis vera et utilis foret comprehensio.—L. ii, cap. 1.

really an excretory product of vegetation, a part used up and brought by contact with the air into a state in which it can no longer be serviceable to the living plant and from which it degenerates by a still further degradation into *humus*, as we have reason to conclude, both from following out the above experiments on the changes of colors to their last result, and from observing analogous changes in the bark itself as it verges towards its latest stage. The pieces of flat red bark possessing the finest color are generally remarkable for their specific lightness, having a texture analogous to that of wood that has lost its firmness by incipient decay. Indeed, it is by a process of *eremacausis* that the red bark acquires its color; the cincho-tannic acid in which it abounds having become oxidized and changed into cinchona red, and under these conditions the alkaloids also appear to undergo some corresponding alterations. They are now implicated with resin, which appears to have also become oxidized so as to act the part of an acid, and is with difficulty separated; the chlorophyll has disappeared. Kinovic acid is still present; gum, which contributed to this so-called resinous character and was abundant in the bark of the smaller branches, has undergone a decrease. But the most remarkable feature is the altered conditions of the alkaloids themselves. Quinine, which formed a considerable proportion of the whole, is now greatly diminished, cinchonine and cinchonidine remaining much the same. The total per centage has undergone no diminution, and an alkaloid, quinicine (?) which was either entirely absent from the smaller quills, or present in a feeble proportion, now appears in a notable quantity.

"This was the result of my observations on South American barks up to 1862. I then thought the total per centage of alkaloids had not diminished with age. The quinicine (?) I found associated with aricine (?) or perhaps the quinia (?) of Batka."

The chief part of this troublesome and noxious residuum I now suppose to be paricine (1881).

Correspondence as to the New Species.

In order to show at once the importance and the difficulty of this investigation, I add the following letters, which complete the history of the subject up to the present time.

I have written to India for more precise botanical details.

Description by a Planter of the Pubescent Species.

"This tree had a very thick stem and the bark also was very thick. The foliage of the tree forms a perfect pyramid; the branches drooping down and then turning up at the ends. The leaves are of a dark green color, rather round at the ends and very pubescent on the under side."

Analysis of Bark.

Quinine.	Cinchonidine.	Cinchonine.	Quinidine.
3·50	1·19	0·24	0·35

or equal to sulph. quinine 4·67 per cent.

(*From Mr. McIvor's Letters.*)

Ootacamund, Dec. 10, 1873.

"This bark is taken from a hairy-leaved variety of *C. officinalis.* It is a

tree of wonderful growth. It produces enormously thick bark and the tree is not injured by wind. The tree from which I now send you the bark is only five years old. It is 26 feet high and has a stem of 16 inches circumference at the ground, and the bark now sent you is taken in a strip from the stem to the height of about 13 feet from the ground.

"This tree grows at least twice as fast as the *C. succirubra*. The bark of this variety which I sent to Dr. de Vrij was taken from a tree grown at a high elevation, and from a N. W. exposure. The bark now sent you is taken from a tree growing at a low elevation with a N. E. exposure. Dr. de Vrij found the bark of this species to yield 10·67 of total alkaloids with 4·72 of crystallized sulphate of quinine.

"If under all conditions this bark be found to yield this amount of alkaloids, and especially quinine, it is certainly the best plant we can grow, being hardy and of rapid growth and perfectly free from canker and other diseases to which the *officinalis* and especially the *calisaya* are liable. I therefore sincerely hope that you will be able to confirm Dr. Vrij's results, and if this occurs in the two barks taken from different positions and elevations it will establish the value of the species beyond doubt. As the matter at present stands, the extraordinary vigorous habit of growth and hairy leaves leave on my mind the impression that it is a species of rather doubtful quinine-producing qualities. I shall therefore be very glad if you are able to confirm Dr. de Vrij's results."

My analysis was as follows:

Sulph. Quinine, . . .	6·00	per cent.
Sulph. Cinchonidine, . .	5·00	"
Cinchonine, . . .	0·60	"
Amorphous alkaloid, . .	0·60	"
	12·20	

Thus rather beyond Dr. de Vrij's results.

"*Ootacamund, April* 30, 1874.

"Allow me to thank you very much for your letter of the 20th February last, and your kindness in having made the analysis of my hairy leaved variety of *C. officinalis*. This plant is, I believe, a true *officinalis*, but as it had the aspect of a bad quinine-producing species, I received with some doubt the several previous analyses I got of this variety, and therefore troubled you to examine its bark. I am now quite confident that this will be one of the most profitable varieties we can grow on the Nilgiris, and our cultivators here will, therefore, be much indebted to you for the information your letter contains.

"There are two strong growing varieties very much alike, the one having a very smooth leaf, the other (your *pubescens*) a hairy leaf. The two plants, a few yards off, look quite identical. They are so in habit and vigorous growth, and it was two years ago [therefore in 1872] that my attention was attracted by the hairy-leaved variety, on all occasions on which I tested or got it tested, yielding a much larger amount of quinine and total alkaloid than the other.

"No doubt the specimens sent you, and to which you refer, were of the smooth leaf growing variety. It is to be regretted that your *pubescens*

(which I think is very well named) produces so much cinchonidine; but as this alkaloid is rising in the market and in public esteem, in a few years this objection may diminish, but 5·50 of quinine is, I concluded, a bark that will always command the attention of manufacturers.

"Although *C. pubescens* is a mere variety, still, it comes true from seed, and I have not noticed any seedling of the hairy variety produce the smooth leaved variety, so closely allied to it, or *vice versa*."

"*Ootacamund, June* 27, 1874.

"I had great pleasure to receive your letter of the 29th ult., and will have much pleasure in sending you dried specimens of the *C. pubescens*, and the kindred smooth leaved variety, as soon as I am able to get them. At present the plants are out of flower and we are in the middle of our rains and enveloped in mists. The *pubescens* is, I think, intermediate between *C. succirubra* and *C. officinalis*, but partakes more of the *officinalis* type. It is a much more robust growth than either, and in all situations far outtops the *succirubra*. I send you a few seeds which, I have no doubt, you will find come up quite true, as it does not vary very much when raised from seed, when the plants from which the seeds are collected are kept separate from other kinds.

"I take the liberty of again sending you some bark of *C. pubescens*. The bark is the narrow strip left on the same tree from which I took the bark sent to you in December last. If not giving you too much trouble, I would very much like to know what this bark yields; the more as Mr. Broughton and Dr. Biddle have been trying to impress on the government here, that mossing does not improve the bark on the trees generally, but that the renewing bark drains the alkaloids from the natural bark adjoining, *i. e.*, that the alkaloids in the natural bark are transferred to the renewing bark.

"I do not believe this to be the case; but if it is so, in any degree, the bark now sent you will show exactly to what extent this takes place, as the narrow strips of bark were surrounded on all sides by renewing bark. I send a small specimen of the renewed bark, also taken from the same species as the bark sent you."

[The strips, like the original bark, presented the appearance of thick fine bark, and gave even better results than those gathered seven months before, thus completely dispelling the transference hypothesis.]

The analysis was as follows:

Sulphate of Quinine,	6·94
" Cinchonidine,	4·48
" Cinchonine,	0·20
" Quinidine,	0·14
Amorphous Alkaloid,	1·14
	12·90

Mr. McIvor continues:

"This theory of the transference of alkaloids has been got up, I believe, to impress on our government the disadvantage of mossing, but even if the alkaloids are transferred we would not lose anything. But the transference of any material once deposited in one part of a vegetable tissue to that

of another part is unknown. A notable example of this is found in the graft. Here two plants differing in their nature are placed in the closest combination, yet in the experience of upwards of two thousand years, and with almost every species of plant, the stock has not been found to communicate to the graft, or the graft to the stock, in the minutest degree, any of those subtle influences on which depend the size and flavor of the fruit, or the color of a flower, both the stock and graft retaining through their existence their respective qualities; though the stock is built up by the sap elaborated by the leaves of the graft, and the graft supplied with its nourishment through the roots of the stock. Moreover, if the alkaloids are transferred, they are not transferred in the same conditions, especially so in red barks, as we find renewed red bark very rich in quinine, and this on trees where the natural bark contains scarcely any quinine."

Ootacamund, August 16, 1875.

"Of *C. pubescens* we planted on private plantations 20 acres last year, and this year we planted out 60 acres of this plant on the Kartary estate.

"I have another seedling raised with the same batch of hybrids, which promises to be better than *C. pubescens*, at least, so far as I have been able to ascertain, it yields nearly 10 per cent. of sulphate of quinine; but I shall send specimens of this variety and of the bark also. We have only a few plants of this kind, and I overlooked it in my investigations of last year. It is not unlike No. 3 of De Vrij's analysis, but has a more oblong leaf."

I did not receive the above-mentioned specimens, and consequently am without the means of identifying the three sorts mentioned above.

The tree which Mr. McIvor sent me proved to be quite different in the bark, and I judge of no value. Some mistake had occurred and this threw me off the scent and led me to give credence to the theory of hybridization which is easily called in (like some other theories) to satisfy minds that do not desire the labor of really fathoming difficult questions.

It will be seen by what follows that the theory of hybridization must be set aside, in this case at least.

I do not find any further reference in letters from Mr. McIvor except in one received after his return from Ceylon, which journey led to his lamented decease. In this letter he speaks of its coming true from seed.

(*From Colonel Beddome.*)

"*The Nilghiris, June* 24, 1881.

"We have a very valuable species here in what Howard calls *officinalis*, var. *pubescens*. There are two varieties, one quite glabrous on the under surface of the leaf, known here as *magnifolia*, and the other very downy, called *pubescens*. They were both supposed to be hybrids of Nilghiri origin, but they are no hybrids. I find them in our oldest plantations. Cross says he recognizes the glabrous one as the "*Pata de Gallinazo*" of the bark collectors on the Chimborazo, and that he found it at a much higher elevation than *succirubra*, and it grows here at a much higher elevation than *succirubra*, growing splendidly at over 7,000 feet, where *succirubra* will not grow at all.

"Two bales of this sold last month in England at a higher price than any *officinalis;* it was the best we have sent home. There is another dis-

tinct species that I cannot name. It has its leaves very hairy on both surfaces, like *Pahudiana*, but the flowers differ from that species, and it has an extraordinary bark, very rough and corky. There are only five trees of it in our 1865 plantations. Cross says it is the true *crispa* of the Loxa neighborhood,[1] and that *he only* has ever collected it, and that he sent the seed of it here with *officinalis* seed in 1863, but that McIvor said it had never germinated. There are two trees here known as *officinalis*, var. *crispa;* one is a very narrow-leaved form, which is easily recognized, but not, I think, of any worth. The other is said to be known in Ceylon as 'crispa,' and is only a smaller-leaved form of ordinary *officinalis*, and quite runs into the type.

"I think on the Nilghiris, at elevations above 5,000 feet, every species and variety should give way to the Uritusinga var. of *officinalis*, and to the species and varieties we call *magnifolia* and *pubescens*. They are both of splendid growth, and both have a very high percentage of quinine. The Calisayas all die out here, and so do the Grey Barks. They certainly require a lower elevation, but even in a warmer climate our long drought may be too trying for them."—*Pharm. Jour. and Trans.*, Oct., 1881.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, Dec. 20th, 1881.

In the absence of the President Mr. Alonzo Robbins was called to the chair. The minutes of the last meeting were read. By oversight, Mr. Hahn's name was omitted as having designed the improvement to the pestle handle, noticed in the last meeting. With this addition, the minutes were approved.

Mr. Wm. McIntyre presented four numbers of the "American Journal of Pharmacy," for which the thanks of the Publishing Committee are due.

Mr. Blair exhibited a device to call attention to the *dispensing of poisons*. The plan consists in attaching a small chain and ball to the package containing the poisonous remedy, whether dispensed in bottle, box or package. The plan elicited considerable discussion, and, while approved of in some respects, it was the general opinion that no device unless accompanied with careful attention will prevent mistakes.

Prof. Remington exhibited a *poison cabinet* invented by H. P. Smith. It consists of a closet with two doors and two drums, which are divided by partitions into several compartments, into each only one medicine or poison is placed, and one partition only can be used at a time. While the cabinet was thought to be advantageous, still the same caution is necessary as with any other arrangement.

Mr. A. P. Brown exhibited a *microscope* of the kind he mentioned in the last pharmaceutical meeting, made by Messrs. Sidel & Co. of Lancaster, Pa. It has an understage, one eye piece aud two objectives; the stand also is very steady, and the workmanship is of excellent quality. The price is

[1] Rather the *Crespilla ahumata*, which should be Pavon's *C. decurrentifolia*.—J. E. H.

$45. There was exhibited a specimen of *sugar* which was largely adulterated with grape-sugar, and sold at a cent a pound less than pure sugar. The differences under the microscope were very marked; the sugar was manufactured in New York.

Prof. F. B. Power read a short paper upon the *analysis of a mineral* supposed to contain molybdenum, and sent to this city for a market. It was, however, found not to contain this metal (see page 8).

Prof. Remington called attention to samples of some volatile oils which are now being placed upon the market under the name of *quintessential oils*, represented to be much stronger than the ordinary oils of the same name. Prof. Power stated that the experience of one large manufacturer in Europe was, that the residue of a resinous character in redistillation of some volatile oils was from 5 to 10 per cent.; and it is well known that but few volatile oils exactly represent the true and entire odor of the plants from whence they are derived.

A sample of *uncured vanilla bean* was exhibited by Prof. Remington. When first obtained this was of quite light brown color, and its odor was much less marked than it is at present, although it is still deficient in this latter respect to the best quality of merchantable beans.

Prof. Remington called attention to a new class of preparations called *Dialysates*, made by Messrs. McIntyre & Embury of New York. The drugs are exhausted, submitted to dialysis, and the fluid solutions of their active principles are reduced to definite strengths.

Allusion was made to the *ferruginous pill of Blaud* in the meeting last month, and it was suggested that carbonate of magnesium might be used more advantageously than carbonate of potassium, as there would be less difficulty in preventing the ferrous sulphate being converted into carbonate.

Prof. Maisch, on behalf of Mr. Hugo Oppermann, presented thirteen packages of *botanical specimens*, mostly of plants from the Southern and Western States, for the Herbarium of the College. On motion, the thanks of the College were voted to Mr. Oppermann for the donation.

There being no further business, on motion the meeting adjourned.

T. S. WIEGAND, *Registrar*.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

A Manual of Organic Materia Medica, being a Guide to Materia Medica of the Vegetable and Animal Kingdoms, for the Use of Students, Druggists, Pharmacists and Physicians. By John M. Maisch, Phar.D., Professor of Materia Medica and Botany in the Philadelphia College of Pharmacy. Philadelphia: Henry C. Lea's Son & Co. 1882. 12mo, pp. 459. Price, $2.75.

The want of a work on this subject, sufficiently concise to be used as a text-book for the students of pharmacy—many of whom are occupied nearly the whole day with the work of the store—has long been felt, and it is a gratification to have the want supplied.

The work is arranged in three parts, the first treating of drugs of animal origin, the second of drugs of cellular vegetable structure, and the third of drugs of non-cellular vegetable structure. The origin of each substance, with natural order and habitat, is first given, then follows a description, and, finally, its active ingredients, properties and dose.

The vegetable cellular drugs are considered under the following heads: roots, rhizomes, bulbs and tubers, twigs and woods, barks, leaves, herbs, flowers, fruits, seeds and cellular drugs not recognized as distinct organs of plants, the latter forming a group consisting of galls, starches, lycopodium, lupulin, crocus, ergot, sassafras pith, cotton, cibotium, cowhage, kamala, yeast, mace.

The third class is devoted to the description of non-cellular drugs, as extracts, inspissated juices, gum-resins, gums, balsams, oleo-resins, volatile and expressed oils.

From the above resume, a very fair idea can be had of the method of treating the subject-matter of the work, and a careful examination of a number of the articles authorizes the opinion that it is full, accurate and concise; the textual description is supplemented by a large number of illustrations, which supply a want noticed by many in some of the best treatises on pharmacognosy ever published; a few of these might be improved.

A feature peculiar to this treatise is a tabular arrangement of the characteristics of the different drugs, reminding one of the key to the botanical treatises, which greatly facilitates the use for those who refer to it for the recognition of drugs; the copious index of nearly 1,600 references will be welcomed by all consulting it. The excellent paper and clear legible type will be appreciated by all whose eyes are tried by the fine type and poor paper so often used in text-books. T. S. W.

Die qualitative und quantitative Analyse von Pflanzen und Pflanzentheilen. Bearbeitet von Dr. G. Dragendorff, o. Professor der Pharmacie an der Universität Dorpat. Göttingen: Vandenhoeck & Ruprecht's Verlag. 1882. 8vo, pp. 285.

Qualitative and Quantitative Analysis of Plants and Parts of Plants.

Works on the subject of phyto-analysis are not numerous. Besides the paper by Mr. H. B. Parsons, which was republished in the April number, 1880, of this journal, we know of only one original work on this subject in the English language, the "Outlines of Proximate Organic Analysis," by Prof. A. B. Prescott, published in 1875. A translation of Rochleder's valuable work on phyto-analysis appeared in this journal in 1861 and 1862, and in 1878 Baron von Mueller published, in Melbourne, a translation of Wittstein's well-known work under the title of "The Organic Constituents of Plants and Vegetable Substances, and their Chemical Analysis." The reason of the scarcity of such works is very apparent; there are but few men who have, by actual investigations, acquired the experience which is absolutely necessary for intelligently arranging the vast and continually increasing material that has to be considered in the elaboration of a scheme applicable to the analysis of all plants. The phyto-

chemical investigations, which for a series of years have been performed in the laboratory of the author, have been productive of important results and cover large classes of proximate principles and natural products, introducing in many cases new reagents and new methods.

The analytical scheme presented in the work before us is intended to furnish quantitative as well as qualitative results, and is based upon the maxim followed ever since proximate analysis has been undertaken, of separating the proximate principles, as much as possible, by the successive employment of different solvents, at first simple and finally chemical solvents. The author commences the investigation with the employment of petroleum benzin, which dissolves chiefly fixed and volatile oils with chlorophyll and traces of other compounds. Anhydrous ether, absolute alcohol, cold and warm (not boiling) water, dilute solution of soda and dilute acid are then successively employed, and finally the lignin and allied bodies are determined.

It will be impossible in this notice to follow the author into the methods recommended or enumerated for separating the various mixtures obtained during the investigation, first into groups of compounds and next into the isolated compound or some derivative which may be more readily determined quantitatively. The isolation of such compounds and the elaboration of special methods for the recognition of principles belonging to different groups and for their determination are more fully treated of in the second part of the work. An appendix contains a tabular enumeration of the elementary analyses of proximate principles, arranged first in alphabetical order and secondly according to the amount of carbon contained therein. The value of the microscope in determining the presence and location of proximate principles in the plants under investigation has not been overlooked, but is pointed out with suggestions as to their recognition.

As an aid for those who undertake the chemical investigation of vegetable products the work is invaluable, not only in pointing out abstract methods for analysis, but in continually referring to those more widely diffused proximate principles and derivatives that are likely to be met with. The work is moreover accompanied with a full index, and contains a number of wood cuts showing the construction of serviceable apparatus.

A Handbook of Uterine Therapeutics and of Diseases of Women. By Edward John Tilt, M.D., Past President of the Obstetrical Society of London, etc. Fourth edition. New York: Wm. Wood & Co. 1881. 8vo, pp. 328.

This, the eleventh volume of Wood's Library of Standard Medical Authors, is devoted to diseases of women and their treatment. The subject, it appears to us, is conveniently arranged, the different forms of medication by tonics, sedatives, antiphlogistics, etc., being considered in different chapters in their relations to the whole range of diseases of women. The value of the treatise to the physician is shown by the fact that three editions have been exhausted, the present one being, indeed, the old work only, so far as the general plan is concerned, the text having been rewritten to bring it up to the present knowledge on the subject-matter of which it treats.

The Opium Habit and Alcoholism. A Treatise on the Habits of Opium and its Compounds, Alcohol, Chloral Hydrate Chloroform, Bromide of Potassium and Cannabis Indica; Including their Therapeutic Indications; with Suggestions for Treating Various Painful Complications. By Dr. Fred. H. Hubbard. New York: A. S. Barnes & Co. 12mo, pp. 259. Price, $2.

That the use of opium and its preparations is on the increase there can be no doubt; the rapid increase of the amount annually imported is far greater than could be accounted for by the increase of population. During the last ten years several interesting works have dealt with this alarming question; such as "Opium and the Opium Appetite," by Dr. A. Calkins, and "Drugs that Enslave," by Dr. H. H. Kane. The work now before us differs from these, and is mainly devoted to a recital of typical cases which were treated by the author, the causes leading to the habit, and the gradually aggravating symptoms presented by the victims. About two-thirds of the book treats of opium; forty pages are devoted to alcoholism, and the remainder to the other drugs mentioned on the title-page. In the treatment of the victims of opium the author strongly advocates the gradual diminution of the drug, and gives examples of complications and the manner of meeting them. In alcoholism he advises the nauseating treatment by flavoring every particle of food with a mixture of eight alcoholic liquids. Although for some years past we have had very little experience in the analysis of spirituous liquors, we have good reason to doubt the correctness of the assertion made on p. 169, that "the vile decoctions now sold as pure old rye or corn whiskies contain potato spirit, strychnia, tobacco and sulphuric acid."

As far as we are able to judge, we believe that physicians will find the cases related to afford fair opportunities for judging of the value of the treatment advocated; but we hope that they may not adopt the author's nomenclature used in the prescriptions, which is a mongrel mixture of English and Latin. The want of both an index and a table of contents materially interferes with the convenient use of the book; in a second edition one or both should be supplied.

The Nurse and Mother. A Manual for the Guidance of Monthly Nurses and Mothers; comprising Instructions in regard to Pregnancy and Preparation for Child-birth; with Minute Directions as to Care during Confinement, and for the Management and Feeding of Infants. By Walter Coles, M.D., Consulting Physician to St. Ann's Lying-In Asylum, St. Louis, etc. Chicago, St. Louis, and Atlanta, Ga.: J. H. Chambers & Co., 1881. 8vo, pp. 153.

The lengthy title of this book explains its object, which is a laudable and important one. That on the subject to which the book is devoted many erroneous and frequently injurious views are prevalent is well known, and the importance of intelligent care in the cases cited is quite apparent. The "instructions" appear to us to be eminently useful and practical, and well adapted for the enlightenment of nurses, and mothers as well, as also offering practical suggestions to medical practitioners.

Proceedings of the Wisconsin Pharmaceutical Association held in Milwaukee August 9, 10 *and* 11, 1881. Janesville. 8vo, pp. 51.

At this, the second annual meeting, the President, Mr. John A. Dadd, presided; the various standing and special committees, as well as the officers, made their annual reports, and a number of practical papers were read. The officers for the current year are: President, F. Robinson, Kenosha. Vice Presidents—Adam Conrath, Milwaukee; T. F. Prentice, Janesville; T. Wolfrum, West Bend; R. Sauerhering, Mayville; W. G. Spence, Manston; J. A. Farnham, Fennimore; A. Trayser, New London, and G. Bauman, Oshkosh. Permanent Secretary, E. B. Heimstreet, Janesville. Local Secretary, L. A. Schultz, Oshkosh, and Treasurer, A. J. Roberts, Janesville. The next meeting will be held at Oshkosh on the second Tuesday of August, 1882.

Die Gewerbefreiheit in der Pharmacie. Von A. Sauter, Apotheker, als Grossrath. Genf: Th. Mueller, 1881. 8vo, pp. 51.

Free Trade in Pharmacy.

In several countries of continental Europe questions as to the continuance of the limitation of pharmacies or the free practice of pharmacy, depending upon furnishing proof of competency, have been discussed for several years past. The pamphlet which we noticed on p. 544 of our October number advances rather far-fetched arguments in favor of the former, while the pamphlet now before us is a vigorous and able plea in favor of the latter. We need scarcely say that the sympathies of the American pharmacists are unanimously with the latter view, the more so since they know from their own experience that some of the chief arguments of the adherents to the former view are based upon ignorance of the true facts as they exist, at least in this country, which is not unfrequently cited as an example of the most unfortunate evils existing in medicine and pharmacy; these facts relate to the asserted bad and adulterated drugs, high prices of medicines, insufficient supply in stock, manufacture of secret remedies, carelessness in dispensing and in the handling of poisons, etc.

Reform in Medical Education.

The annual address delivered before the American Academy of Medicine at its sixth annual meeting, in New York, Sept. 20, 1881, by the President, Edward T. Caswell, A.M., M.D., of Providence, R. I.

Annual Report of the Surgeon-General, U. S. Army, 1881. 8vo, pp. 23.

Annual Report of the Chief Signal Officer of the Army to the Secretary of War for the Year 1881. 8vo, pp. 86.

Both these official reports contain a large amount of matter of general interest. In this respect we have been particularly attracted by the growth of the library of the Surgeon-General's office, which now numbers about 54,000 volumes and 60,200 pamphlets, and by the progress of the publication of the Index-Catalogue.

The importance of the signal service for agricultural, maritime and other interests are being continually better appreciated; the arguments in favor of the adoption of the metric system by the bureau, at least in its scientific meteorological work, are strong and convincing.

Transactions of the Michigan State Medical Society for the Year 1881. No. 1. Vol. VIII. Lansing, 1881. 8vo, pp. 111.

The Chemists' and Druggists' Diary for 1882. London. 4to.

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Scott, Amos Gilbert,	Doylestown,	Pa.	Alfred Tatem.
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Whitaker, Milton Westcott,	Millville,	N. J.	Wm. R. Wilson.
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Behringer, Albert Christian,	Philada.,	Pa.	Dr. A. Nebeker.
Buck, Charles Edward,	Skowhegan,	Me.	J. P. Remington.
Binns, John Pemberton,	Philada.,	Pa.	W. R. Warner & Co.
Burt, Walter Colton,	Philada.,	Pa.	Bullock & Crenshaw.
Bullock, Wm. Anthony,	Philada.,	Pa.	Bullock & Crenshaw.
Booth, Fred. Smith,	Philada.,	Pa.	John F. Trenchard.
Bird, Wellington Henry,	Danville,	Pa.	J. B. Moore.
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Baggé, Edward Everett,	Camden,	N. J.	S. G. Baggé, M.D
Byers, Huizinga Clarence,	Pottstown,	Pa.	S. T. Jones.
Boger, Cyrus Maxwell, Jr.,	Lebanon,	Pa.	Bullock &,Crenshaw.
Barkhuff, James Addison,	Amsterdam,	N. Y.	Wendel & Becker.
Baugh, Harry Leonard,	Philada.,	Pa.	J. T. Shinn.
Bush, John Albert,	Peoria,	Ill.	F. C. Bourscheidt.
Bower, Lewis Collier,	Philada.,	Pa.	H. A. Bower.
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Clark, Jacob Miller,	Milton,	Pa.	Henry S. Gross.
Crenshaw, Edmund Austin,	Philada.,	Pa.	Bullock & Crenshaw.
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Cohen, Isaac,	Philada.,	Pa.	R. J. Fritzinger, M.D.
Corrie, Wm. Moore Guilford,	Philada.	Pa.	S. C. Blair, M.D.
Cunningham, Benjamin Amos,	Frederick City,	Md.	I. J. Grahame.
Coblentz, Virgil,	Springfield,	Ohio.	C. & S. Coblentz.
Clapp, Chambers Brown,	Cleveland,	Ohio.	C. J. Biddle.
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Dare, Charles William,	Troy,	Pa.	B. B. Mitchell.
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De Frehn, Charles William,	Pottsville,	Pa.	Frank R. Pershing.
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Fr iley, William Otterbein,	Lancaster,	Pa.	Wm. T. Wylie.
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Good, Harvey Jonas Tilgham,	Allentown,	Pa.	W. W. Moorhead.
Geiger, Jacob Franklin,	Boyertown,	Pa.	Thos. J. B. Rhoads.
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Green, Howard Lee,	Falls of Schuylkill,	Pa.	A. W. Miller, M.D.
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Herwig, Emil Moser,	Philada.,	Pa.	E. Herwig.
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Knaus, Frederick Jacob,	Philada.,	Pa.	John Oddy, M.D.
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Miller, Wm. Watson,	Philada.,	Pa.	
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Morrisson, John Joseph,	London,	England.	R. N. Mitchell.
Matthews, Wm. Leaming,	Philada.,	Pa.	Henry A. Bower.
Miller, John Knox,	Eaton,	Ohio.	J. Donohol & Co.
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Morton, William John,	Allentown,	Pa.	Randal W. Morgan.
Merrick, Edwin Augustus,	Philada.,	Pa.	W. H. Pile & Sons.
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Osborne, Melmoth Mercer,	Philada.,	Pa.	Charles Shivers.
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Reynolds, William Davis,	Mahanoy City,	Pa.	Dr. B. H. Davis.
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Sholl, Benjamin Franklin,	Mt. Joy,	Pa.	Chas. L. Mitchell, M.D.
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Stedem, Frederick William Edward,	Logan,	Ohio.	E. B. Garrigues & Co.
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Stallman, Harry Reeder,	Chestnut Hill,	Pa.	T. L. Buckman.
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Seitz, John George,	Cleveland,	Ohio.	Herrmann Rave.
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Scheible, Charles Frederick,	Mobile,	Ala.	E. Kronenberg.
Thomas, Daniel Judson,	Scranton,	Pa.	Wm. H. McGerrah.
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Wilgus, William Alcott,	Frankford,	Pa.	J. F. Wilgus.
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Walker, George Allen,	Yardville,	N. J.	Albert L. Thorn.
Worthington, Isaac Wilson,	Philada.,	Pa.	Warrington & Trimble.
Wevill, George Edward,	Philada.,	Pa.	A. W. Duvall, M.D.
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THE AMERICAN JOURNAL OF PHARMACY.

FEBRUARY, 1882.

OLEUM BETULÆ LENTÆ.

By George W. Kennedy, Ph.G.

Read at the Pharmaceutical Meeting, January 17.

Having received several pressing invitations from Mr. A. H. Seidle, of Middleport, Schuylkill county, Pa.,—a small village situated midway between Pottsville and Tamaqua, on the Reading Railroad, about 9 miles east from the former and $8\frac{1}{2}$ miles west from the latter place —to visit him and inspect his apparatus used in distilling oil of teaberry, so-called, the writer accepted, and recently made a visit to the place. Arriving at the village early in the morning I was received very kindly by the gentleman, and after a walk of about a half mile we reached the building where the oil is made, which is an ordinary one-story frame building; but quite large, and roomy enough for erecting additional stills and manufacturing considerable more of the oil than is made at present. The whole process was explained to the writer in a very satisfactory manner, commencing with the cutting down of the tree to the final packing of the oil ready to be shipped. There was no concealment made of a single point; in fact, the proprietor was anxious for me to become thoroughly acquainted with the preparation of the oil.

In locating a place for the distillation of the oil, there are several things to be taken into consideration. First, to have an abundance of material conveniently at hand, so that the supply may not soon be exhausted; and second, a good supply of water. The above-named place in these respects seems to be a very desirable spot for some time to come. I was told by the proprietor that sometimes the teaberry leaf is used exclusively, at other times the birch and wintergreen are mixed, and at this season of the year birch is used to the exclusion of all others; the oil extracted from all is mixed, and sold as oil of wintergreen. For a long time the oil of birch, wintergreen and of other plants have been considered almost identical, if not altogether so, and

it was one of my objects in making this visit to obtain the oil of birch bark, with the view of applying to it the usual tests for oil of wintergreen, the result of which will be given further on.

The species of birch used is the Betula lenta, commonly known in this locality by the names of cherry, sweet and black birch. It grows to the height of 75 feet; but as generally found is from 10 to 25 feet high. The bark is very sweet-aromatic; the leaves are ovate or oblong-ovate, form a more or less heart-shaped base; acuminate, sharply and finely double-serrate; when mature shining and bright green above, and glabrous, except on the veins beneath. It is found in moist woods, and grows north from New England to Illinois, and along the Allegheny regions southward.

The first step in the preparation of the oil is the gathering of the bark, or rather of the tree, as the whole tree is used, except a few small sprouts near the ground. These are left undisturbed, and in 5 years will be found to have grown to the height of 8 or 10 feet, and are then considered large enough to be cut for the extraction of the oil. It will be observed that from the stumps of trees used this year, a new growth may be used 5 years hence, and so on every five years; this industry does, therefore, not involve the destruction of the trees, as one would naturally suppose. The small trees are preferred, and are gathered by a man, for which he is paid about $3.00 per ton delivered, besides the payment to the owners of the land of $1.00 per ton for the privilege of cutting the trees, making in all $4.00 per ton for the trees delivered at the place where the oil is manufactured.

The trees are then submitted to a chopping machine, containing 2 large knives, about 18 inches long, and 3 to 4 inches wide, made strong and heavy, and which are so arranged that they are operated by a wheel, similar to that in the ordinary drug mill; for every revolution of the wheel the knives cut 4 times, and it requires but a short time to cut a ton of the material into pieces from 1 to 4 inches long, in which condition they are ready for the stills. These consist simply of heavy wooden boxes with copper bottoms, resting on a stone foundation, built about 15 to 18 inches above the surface of the earth, a place being made for fire. Wood is used altogether for fuel. The dimensions of the box or still are 4 x 6 feet and 3 feet high.

The material being ready for distillation, it is placed in the still, as much as this will hold, and a sufficient quantity of water is added to fill the still about one-third full. The still is generally permitted to

remain in this condition over night, a fire is made in the morning, and distillation proceeds nicely. The condensers used are of two different kinds, one being the ordinary copper worm placed in a large barrel, while the other is made of copper pipe, about 2 inches in diameter, and shaped like the letter U, each wing being 12½ feet long, and placed in a trough. A stream of cold water is constantly passing into the barrel and trough, and is carried several hundred feet by a wooden gutter, from a clean clear creek of spring water. The condensed steam in the condenser consists of water and oil. The U-shaped condenser, the distiller says, is more desirable than the other, because the first portion of distillate contains oil, whilst in the old worm style several bucketfuls of water pass out before a drop of oil makes its appearance. As the liquid comes from the condenser a novel contrivance is used for collecting the oil and water, consisting of a Mason's fruit jar (2-quart size), complete; a small tin funnel is placed in the metallic cap of the jar at one side, and extends below the cap, the condensed liquid runs through the funnel into the jar, and as the weight of the oil is greater than that of the water, it sinks to the bottom of the receiving vessel. The water runs out through a pipe fastened into the cap on the side opposite to that where the funnel is inserted, is conducted into a bucket, and finally emptied into a barrel, to be used again for the next lot of material. The advantages of using the same water in successive operations are apparent. When distillation ceases, the crude oil thus obtained, containing a little water and fragments of vegetable matter, is emptied into a can, with a broad flat spigot fastened as close as possible to the bottom, and the impurities floating on the surface; the clear oil is then drawn off through the spigot.

The rectification of the oil is accomplished in a very short time, the process being decidedly simple; but as I was requested and promised not to make it known at the present time, I regret that I am compelled to withhold this valuable information, since the perfection of this process has cost Mr. Seidle a considerable sum.

The odorous principle seems to be thoroughly extracted from the bark, and after the distillation the contents of the still have not the faintest aromatic odor or taste.

It is generally understood in preparing the volatile oil from birch bark to be absolutely necessary to submit the material to maceration with water, before distillation, in order to develop the oil. The distiller informed me that he obtains the oil occasionally from birch as

well as from teaberry, without previous maceration. Sometimes the bark is covered with ice and snow. As stated before, the material is generally placed in the still the night previous to commencing distillation in the morning. The steam generated passes up through the drug, and extracts the oil in its upward exit; but only about one-third of the bark is covered with water in the still. When the bark is macerated the yield is about 20 per cent. larger.

There are three layers of bark on the wood. The outer thin tissue contains no oil; the next, or middle layer, is of a greenish color, and likewise contains no oil; the inner layer, next to the wood, which is much thicker than the others and more spongy, yields the oil. Mr. Seidle informs me that during the month of October, or about the time the leaves fall, little if any oil is made, on account of the small yield, hardly reaching 30 per cent. of the yield of any other month during the year. The bark is never dried, but cut up and placed in the still in its green condition, and the oil extracted.

Water running from the coal mines cannot be used in the distillation, because it contains sulphur and its compounds, which seem to act very destructively on the yield, causing a falling off of at least 75 per cent.; that is to say, instead of obtaining 4 pounds of oil, but 1 pound is obtained, and this of a bright blood-red color.

The yield of oil from birch, using the whole tree in a green state, is 5 pounds from a ton of 2,240 pounds, or 0·23 per cent. The yield obtained from wintergreen herb averaged 18 pounds from a ton of 2,240 pounds, or about 0·80 per cent.; but the latter plant is considerably more expensive to gather, costing at the lowest calculation about $30.00 per ton, and in this locality labor cannot be procured at that price, since the gathering of the herb is very tedious, and the laborer can scarcely earn sufficient to live on.

The oil of Betula lenta, obtained as above described, is entirely colorless, of a strong and agreeable aromatic odor, and of a sweetish aromatic taste. I have found it to have a specific gravity of 1·178, about the same weight as oil of wintergreen. The oil boils briskly at from 424° to 436°, and the boiling point rises to 442°F., where it remains stationary; a little higher than that of oil of teaberry, which is said to be 431°F. The oil on being heated to boiling, changes in color from colorless to a light reddish-brown.

Like oil of gaultheria, with ferric chloride in water, it produces a dark violet color, and with a concentrated solution of soda or potash

a solid crystalline mass is formed. Heated with nitric acid, orange-yellow crystals are produced, nitrous acid fumes being at the same time given off, and when treated with cold nitric acid, crystallization takes place, forming methyl-nitrosalicylate. Treated with muriatic acid, after standing several days, white crystals are formed in quantity.

On adding 1 drop of the oil to 1 ounce of lime water, the odor entirely disappeared, and a very voluminous white precipitate of methyl-salicylate of calcium occurred, the same as with oil of teaberry, previously noticed by Mr. Wellcome ("Am. Jour. Phar.," 1875, p. 426). With sulphuric acid a dark red color is produced. This would account for the oil being red when coal-mine water is used in its extraction. Treated with iodine the color becomes much darker, and the oil of a syrupy consistence. In all respects, except the slight difference in the boiling point, the oil appears to be identical with that of oil of teaberry.

Mr. Seidle has no difficulty in disposing of his oil; it is put up in 25-pound cans, shipped principally to New York, and sold as oil of wintergreen, no matter whether it is made of birch, birch and wintergreen, or wintergreen. At the present time he is paid $2.65 per pound, and makes about 30 pounds per week, amounting to $79.50. The expense incurred is about $25.00, leaving a net profit of about $50.00.

It would seem proper that the oil be sold as oil of birch, and not as oil of wintergreen. Whilst the sale of it as oil of teaberry is not intended to deceive anyone, since it is believed to be identical with the oil of gaultheria, I do not apprehend any difficulty in finding a ready market for it if sold as pure oil of birch; in fact, I am of the impression that a demand could easily be made for it if sold by its proper name. The volatile oil of birch bark would even seem to deserve a place among the officinal drugs in the Pharmacopœia.

Isolation of Strychnine.—A. H. Allen recommends a mixture of equal volumes of ether and chloroform for the separation of strychnine recently precipitated from an aqueous solution. Ether alone has very little solvent power, and chloroform does not readily separato from the aqueous liquid.—*Analyst,* 1881, p. 141.

WINE OF WHITE ASH.

By Thos. S. Wiegand, Ph.G.

Read at the Pharmaceutical Meeting, January 17, 1882.

Within the past two or three years this preparation has been prescribed with great success by Dr. Chas. P. Turner, of this city, in the treatment of dysmenorrhœa and the troubles that so frequently complicate it; inquiries have been made regarding it and it is in answer to these this paper has been written.

The botanical name of the tree is Fraxinus americana, *Lin.*, White Ash, sometimes written Fraxinus alba, improperly so, as no botanical authority which I have consulted gives this as a synonym; Dr. Muhlenberg, the botanist, proposed the name of *discolor* in consequence of the marked difference between the upper and under surfaces of the leaf.

The tree, which is one of the largest of our forest trees, reaching in favorable locations a height of eighty feet, with a diameter of three feet, is found mostly in swampy lands or on the margins of rivers; it flourishes in northern New York and northward in Canada, but is found in New Jersey, Pennsylvania and farther south and west; its common name of White Ash is most probably due to the color of the bark by which it may easily be distinguished; on the trunk of the tree the bark is often deeply furrowed and divided into squares of 1 to 3 inches; the foliage is made up of compound leaves consisting of 3 or 4 pairs of leaflets, with a terminal one; the leaflets being oval acuminate, petiolate and glaucous on the under side. An excellent plate, showing the leaf half the natural size, and the fruit of full size, is given in Michaux's "North American Sylva," from which this description has been taken.

The bark, as found in commerce, is usually concised transversely, and when dried is of a light salmon color, of very slight odor and bitterish taste. The virtues are best extracted by a weak alcoholic menstruum. The following formula yields a preparation which Dr. Turner has found most useful in practice:

Take of Inner bark of the White Ash, powd. No. 40,	℥viii
Sherry wine sufficient for . . .	Oii

Macerate the bark for three days, pack firmly in a cylindrical percolator and displace slowly two pints.

The wine thus prepared has a color of brown sherry and a taste quite peculiar. The usual dose is a teaspoonful 3 times a day.

THE RAPID PREPARATION OF MERCURIAL OINTMENT.

Editor American Journal of Pharmacy.

In the December number of the JOURNAL, Mr. Phil. Hoglan gives a process for rapidly making mercurial ointment by using a small quantity of old mercurial ointment for the extinguishment of the mercury. There is no doubt of its success. In fact, any old ointment, whether mercurial or not, will answer, but the process is objectionable in this, that the little "leaven leaveneth the whole lump," and soon causes the ointment to become rancid and irritating.

We had occasion a few months since to make some mercurial ointment in a hurry, and used a small quantity—one ounce to twelve—of old ointment, and when it was used a few weeks afterward, it caused an irritation and soreness that was several days in healing, so that we were glad to dispense with its use, instead of dispensing it over the counter. Won't you please give us your opinion of the proposed process?

J. H. REDSECKER.

Lebanon, Pa., Dec. 29, 1881.

REMARKS BY THE EDITOR.—The injurious effects of "old" rancid fat when mixed with good fats are well known; our valued correspondent states the case correctly: it "leaveneth the whole lump," and in the case of mercurial ointment renders, in a short time, the entire amount unfit for medicinal use, at least in those cases where it is to be applied to tender or excoriated surfaces. Yet it does not necessarily follow that Mr. Hoglan's *old* mercurial ointment should also be *rancid*, though it is undoubtedly correct that even if preserved in a cool place and as much as possible protected from contact with the atmosphere, the mercurial ointment of our present and of most other pharmacopœias, will in the course of time and under the conditions under which it must necessarily be kept and occasionally exposed, gradually become rancid. That a *rancid* mercurial ointment is not absolutely necessary for facilitating the extinguishment of mercury, but that a *fresh* ointment may be used with the same good result, has been observed about fifty years ago; for A. Buchner ("Repert.," 1834, xlviii, p. 267) states distinctly that the mercurial ointment used for extinguishing the mercury need *not* be rancid. The same fact was also recently proven by E. Dieterich, an abstract of whose paper will be found in this Journal,

1880, p. 138–142, and has been corroborated by Prof. Remington, who states that "the addition of some properly made mercurial ointment which is entirely free from rancidity, facilitates the extinction of the mercury" ("Am. Jour. Phar.," 1881, p. 192).

That ether is an excellent aid in the extinguishment of mercury was noticed by J. L. Desmarest in 1829, and Eugene Renoult recommended the use of 30 grams of it for one kilogram of lard ("l'Officine"); its employment in conjunction with mercurial ointment *from a previous operation* (it will be noticed that *old* ointment is not mentioned) was strongly recommended by Geo. Baylé in 1874 ("Am. Jour. Phar.," 1874, p. 561). The ether will evaporate during the trituration, and the remaining ointment will then be as prone to rancidity as without its addition. It would therefore seem to be advisable to add a preservative agent, for which purpose at various times, storax, Peruvian balsam, tincture of tolu, tincture of benzoin, and benzoinated lard have been proposed. Prof. Remington advocates compound tincture of benzoin in a proportion which would introduce less than one per cent. of resinous matter into the ointment, an amount which appears to be too insignificant for causing irritation. But it seems to be well worthy of investigation, whether, by substituting cacao butter or a similar fat for the suet, a permanently sweet and non-irritating ointment cannot be produced. The addition of paraffin to the lard does not prevent the latter from turning rancid, and the substitution of soft paraffin for all the fats is objectionable on therapeutic grounds, at least in a number of cases.

PRACTICAL NOTES FROM FOREIGN JOURNALS.

By the Editor.

Testing of Benzoic Acid.—The asserted reduction of potassium permanganate by benzoic acid prepared from urine has been the subject of several investigations. Dr. C. Schacht ("Archiv d. Ph.," Nov., 1881, p. 321) has made comparative experiments with benzoic acid obtained 1, from urine; 2, from toluol; 3, from benzoin (commercial); 4, from Siam benzoin by sublimation; 5, from the same by the wet process. In acid and, more characteristically, in alkaline solution, a reduction takes place only with the last two acids. On dissolving at 15°C. 0·1 gram of benzoic acid in 3 cc. of potassa solution, spec. gr. 1·177, diluting with 3 cc. of distilled water, adding 5 drops of a ½ per cent. solution

of potassium permanganate and heating to boiling, the first named three kinds of benzoic acid produced dark green colored liquids in which gradually brown precipitates appeared, while Nos. 4 and 5 produced decoloration of the liquids and brown precipitates, due to the presence of cinnamic acid.

Jacobsen ("Industrieblätter," No. 50) states that pure benzoic acid from all sources has exactly the same behavior against reagents; the source of benzoic acid can therefore only be ascertained chemically in the presence of impurities resulting from the material. Benzoic acid prepared from toluol (benzodi- or trichloride) is apt to contain chlorine, which is best detected by cupric oxide upon the platinum wire in the flame. If prepared from urine, the benzoic acid contains nitrogen, which is detected by potassa as ammonia, and has usually also an odor like horse sweat. Benzoic acid from resin is free from nitrogen and chlorine. The test with potassium permanganate is of no value since benzoic acid from toluol will be reduced on account of the presence of bitter almond oil and of derivatives from cinnamic and phenyl-acetic acid; if prepared from urine, various organic compounds will effect the reduction, and if obtained from resin, cinnamic acid and empyreumatic products have the same effect. But after purification, sublimation, etc., of these acids, the reducing power is materially modified or entirely removed. Benzoic acid sublimed from the resin in imperfect apparatus always contains more of the empyreumatic reducing compounds than are obtainable in the modern apparatus with proper ventilation and low heat.—*Phar. Centralh.*, Dec. 22, 1881, pp. 565–567.

Chinoline Tartrate.—The results of the physiological and therapeutical observations of Donath (this Journal, 1881, pp. 173, 620), Dr. Loewy, of Vienna, and Dr. Sakowsky, of St. Petersburg, prove that the action of chinoline is analogous to that of quinine. The alkaloid is an oily liquid of a peculiar odor, insoluble in water, but easily soluble in alcohol, ether, chloroform and similar solvents. Most of its salts are deliquescent and difficult to crystallize; but the tartrate has been prepared by Hofmann and Schoetensack in glossy silky crystals which are permanent in the air, are soluble in water, have a slight bitter almond odor and a somewhat pungent taste resembling that of peppermint water. The salt is used in about the same manner and dose as sulphate of quinine; in cases of intermittent fever, 1 gram of it is given in 2 or 3 doses about 3 hours before the chill, either as powder enclosed in wafers, or dissolved each in 50 grams of water

with 1 to 3 grams cherry laurel water and sweetened with raspberry syrup; should nausea be observed, a tablespoonful of lemon-juice or small pieces of ice may be given.

The absence of bitter taste renders chinoline tartrate of peculiar importance in the treatment of children. A good formula for children of 4 to 8 years is the following:

℞ Chinolini tartrat., . . . 1·0 (gr. xv)
Aquæ destill.,
Syr. simplic., . . *aa* 50·0 (ʒxiiss)
S. To be taken in two days in about four doses.

A *mouth wash* has been used with advantage consisting of chinoline tartrate 1·5, distilled water 140·0, alcohol 20·0, oil of peppermint 1 drop; it is to be diluted with 5 to 8 parts of water.

The price of chinoline tartrate is about one-fifth that of quinine.—*Phar. Zeitung*, Oct. 19, p. 630.

Estimation of Alkaloids as Picrates.—Hager recommends the gravimetric estimation of alkaloids by a solution of picric acid, saturated at ordinary temperatures. The alkaloids are preferably employed as sulphates in moderately acid solution. The precipitation should be effected below 15°C. 1 gram of nicotine sulphate requires at least 300 cc. of the picric acid solution, and about 150 cc. of the latter are necessary for 1 gram of sulphate of a cinchona alkaloid. Coniine, aconitine, atropine, veratrine, codeine, strychnine, morphine and others are not adapted for estimation in this manner; but reliable results are obtained with nicotine, brucine, berberine and the cinchona alkaloids.—*Phar. Centralhalle*, 1881, pp. 399, 400.

Estimation of Quinine as Herapathite. — A. Christensen, from a series of experiments considers De Vrij's method, though not absolutely accurate, the best yet recommended, and arrives at the following conclusions:

1. Acidulated alcohol dissolves notable quantities of herapathite, and the correctness of the results will be influenced by too much as well as by too little acid.

2. The concentration of the liquid may influence the result.

3. Cinchonidine periodosulphate may be precipitated in the presence of notable quantities of that alkaloid, notwithstanding the precaution, recommended by De Vrij, of adding the reagent slowly, and with constant stirring.

4. Quinine iodosulphates, with more iodine than is contained in herapathite, may be formed, unless the precipitation is effected in the

cold, and the precipitate filtered in a short time (one hour).—*Pharm. Zeitschr. f. Russl.*, 1881. Reprint.

[The sources of error pointed out above are avoided by following the process as modified by Dr. De Vrij in "Amer. Jour. Phar.," 1880, p. 394, in which, however, the precipitation of quinine in the cold is recommended, and the subsequent heating of the mixture in a water-bath, so as to obtain the herapathite crystallized. EDITOR.]

Estimation of Alkaloids in Cinchona Bark.—Prollius observed that if a mixture of 38 grams alcohol, 10 grams chloroform, 2 grams ammonia water, and 5 grams cinchona bark, is agitated in a stoppered bottle, a wine-red liquid is obtained, containing all the cinchona alkaloids. On mixing the clear decanted liquid with 5 grams finely levigated calcium hydrate, it is at once decolorized, and on slow evaporation the quinine is left of a resinous appearance, while the other alkaloids are crystalline. From the weight of the decanted liquid the weight of the cinchona bark represented therein is easily calculated, and the percentage of alkaloids from the weight of the residue obtained on evaporation.

A simpler process for ascertaining the percentage of quinine and of the other alkaloids soluble in ether is as follows: A mixture is made of 88 ether, 4 ammonia water and 8 alcohol, the latter serving merely for uniting the ammonia with the ether. Thirty grams of this mixture are well agitated during several hours with 3 grams powdered cinchona bark; 20 grams of the clear solution, containing the alkaloids in question, on being mixed with a slight excess—5 or 6 drops—of dilute sulphuric acid, separate a thick solution of the alkaloidal salts, from which the ether may be readily decanted; the latter should be well agitated with 2 grams and then with 1 gram of water, in order to obtain all the alkaloids. The mixed aqueous solutions are heated to expel all the alcohol, and, while still warm, precipitated with ammonia. The weight of the precipitate, after washing and drying, multiplied with 50, indicates the percentage of the alkaloids soluble in ether.

The alkaloids may also, though less correctly, be weighed as sulphates, if the etherial tincture is freed from ammonia by agitation with water, and then very carefully neutralized with dilute sulphuric acid, when the sulphates will at once crystallize out; a slight excess of acid will readily dissolve these salts.—*Archiv d. Phar.*, August, 1881, 85–87.

Estimation of Nicotine in Tobacco.—Dr. J. Skalweit, while making a large number of estimations of nicotine in tobacco, has carefully examined the various methods proposed. Schloesing's process ("Am. Jour. Phar.," xix, 69) yields unreliable results, owing to the difficulty of completely extracting tobacco with ether, and of exactly neutralizing the viscous resinous liquid with acid. Varying the apparatus by employing those recommended by Soxhlet and by Tollens for the extraction of fat, or the apparatus of Schiel (*Ibid.*, 1860, p. 137), the results were not improved. If distillation in the presence of alkali and water be resorted to, a decomposition of the nicotine seems to be unavoidable. The author therefore converts the alkaloid into sulphate, and extracts this salt by 98 per cent. alcohol.

The tobacco is dried at 50°C., finely powdered, and the moisture estimated with a weighed sample, 20·25 grams of the powder are mixed with 10 cc. normal sulphuric acid and 200 cc. alcohol of 98 per cent. The mixture is boiled for two hours in a flask, connected with a reversed condenser, and when cool poured into a measuring flask of 250 cc., the boiler being rinsed out with absolute alcohol sufficient for obtaining the measure indicated; 100 cc. of the clear liquid are placed in a flask, provided with a funnel tube terminating near the bottom in a fine point, and with a bent tube for carrying off the alcoholic vapors; the greater portion of the alcohol is distilled off, 30 cc. of potassa solution, sp. gr. 1·159, are added, and the distillation is continued until the liquid, dropping from the condenser, shows no reaction on litmus paper. The distillate is titrated with tenth-normal sulphuric acid, and by dividing the cubic centimeters found with 5, the percentage of nicotine in the tobacco examined is ascertained. The absence of ammonium sulphate is proven by evaporating to dryness and dissolving in 98 per cent. alcohol.—*Archiv d. Phar.*, July, 1881, pp. 36–41.

Detection of Starch Sugar in Cane Sugar.—P. Casamajor observed that methyl alcohol of 50° by Gay Lussac's alcoholometer, if saturated with starch sugar, will dissolve cane sugar, either white or yellow, very readily from mixtures of cane and starch sugar, without dissolving the latter. The degree of approximation in determining the latter has not yet been ascertained.—*Chem. News*, xlii, 326.

Detection of Starch-Sugar Syrup Mixed with Sugar-house Molasses.—P. Casamajor observed that straight sugar-house syrup, when mixed with three times its volume of methylic alcohol, will dissolve by stir-

ring, giving a very slight turbidity, which remains suspended, while syrups containing an admixture of starch-sugar give a very turbid liquid, which separates when left at rest into two layers, the lower being a thick viscous deposit containing the glucose syrup.

Considerable quantities are sold of a thin syrup of about 32°B., in which the proportion of sugar to the impurities is greater than in common sugar-house molasses. When a syrup of this kind is stirred with three times its volume of methylic alcohol, a marked turbidity and deposition will take place, which consists of pure sugar. The crystals are hard and gritty, and adhere to the sides of the glass, and are deposited on the bottom. There is no resemblance between this precipitate and that due to starch-sugar syrup.

Straight sugar-house syrup of about 40°B. will not dissolve in three times its volume of $93\frac{1}{2}$ per cent. ethylic alcohol.—*Chem. News,* Dec. 2, 1881, p. 265.

Reactions of Milk. By Dr. C. Arnold.—Fresh milk yields with tincture of guaiacum, in a few seconds, a blue color; the reaction appears at once if the milk is carefully heated to from 40 to 60°C.; but it is not produced if the milk was heated to 80°C., or to boiling. Sour milk also shows the reaction; but mineral acids and caustic alkalies prevent it. The reaction is due to the presence of ozone in fresh milk. Tincture of guaiacum yields also a blue color with the emulsions of oils of poppy, olive, ricinus and flaxseed.

Fresh as well as boiled milk is capable, like blood corpuscles, of transferring ozone. A mixture of starch paste, potassium iodide and milk in contact with old oil of turpentine, at once turns blue at the point of contact, the zone becoming rapidly broader. After boiling the milk for some time the color appears only after several minutes.

Fresh milk freed from casein by acetic acid, if mixed with potassa solution and a trace of copper sulphate, does not yield the violet reaction characteristic of peptones; but after the milk has been kept for over twelve hours, the reaction appears, and the gradual increase of peptone is indicated by the deeper violet color.—*Archiv d. Phar.,* July, 1881, 41, 42.

Enemata of Peptones.—M. Henninger gives the following formula for enemata of peptones. Five hundred grams of very lean meat, minced fine, are placed in a glass receiver, on which are poured 3 liters of water and 30 cubic centimeters of hydrochloric acid of density 1·15; to this is added $2\frac{1}{2}$ grams of the pure pepsin of commerce, at

the maximum of activity, that is to say, digesting about two hundred times its weight of moist fibrin. It is left to digest during twenty-four hours at a temperature of 45°C. (113°F.), either in a water-bath or a stove; it is then decanted into a porcelain capsule, brought to boiling point; and, whilst the liquid boils, an alkaline solution is poured into it (250 grams of carbonate of sodium to 1,000 grams of water) until it shows a very slight alkaline reaction. About 165 to 170 cubic centimeters of this solution must be added to it. When this result is obtained the boiling liquid is passed through a fine linen cloth, the insoluble residue being expressed; and this liquid, which amounts to about 2½ liters (3 pints), is reduced in the water-bath to 1,500 or 1,800 cubic centimeters. Half of it is administered every day in three enemata, adding 200 grams of white sugar for the 24 hours. The whole of the meat is not dissolved; the fat, the tendons, the connective and elastic tissues form an insoluble residue, amounting to about a third of the meat used.—*Phar. Jour. and Trans.*, Nov. 12, 1881. From Paris *Médical*, No. 29.—Reprinted from the British *Medical Journal.*

Ammoniacal Peptonate of Iron.—Jaillet and Guillart propose the following formula: Dissolve dry peptone 5 grams in cherry laurel water 50 grams, and add pure glycerin 50 grams, afterwards a mixture of solution of ferric chloride 6 grams (spec. grav. 1·26 and containing 26 per cent. of anhydrous ferric chloride) with cherry laurel water 25 grams. Now add ammonia water, drop by drop, until the flocculent precipitate is dissolved, taking care to avoid an excess of ammonia, and with cherry laurel water make the liquid measure 200 cubic centimeters. The solution, sufficient to fill the syringe of Pravaz, contains 2·5 milligrams of metallic iron.

This preparation has not the inky and styptic taste of ferric chloride, produces neither pain nor inflammation under the skin if the injection is made at 37 or 38°C., and does not give the reactions for iron with the ordinary reagents.—*Bull. gén. de Thérap.*, Dec. 30, 1881, p. 536.

Sucrocarbonate of Iron.—Dr. Dauvergne regarding this preparation (see "Amer. Jour. Phar.," 1881, p. 360) as being not a true chemical compound on account of its being decomposed by water, and claiming for himself the combination in 1842, of sugar with carbonate of iron; Dr. Dujardin-Beaumetz refers to the numerous chemical compounds which are decomposed by water and briefly reviews the history of saccharated carbonate of iron, which was proposed by Dr. Becker, of Mulhausen, and prepared in 1837 by C. Klauer, pharmacist, of the

same place, in the proportion of 2 parts of sugar to 1 part of the carbonate. In 1838 Vallet, guided by these observations, invented his pills. In 1841 Klauer's preparation was adopted by the pharmacopœia of Baden. In the British pharmacopœia it contains 40 per cent. and in the German pharmacopœia 20 per cent. of carbonate, the latter amount corresponding nearly to that found in the crystals (18·44 per cent.). The author strongly recommends the adoption by the pharmacopœia of the powder as the most agreeable and most convenient pharmaceutical form of ferrous carbonate.—*Ibid.*, Oct. 15, p. 316, 317.

Antiseptic Mixture.—A. Pennès recommends the following: Dissolve, by agitation, purified salicylic acid 50 grams, santonin and quinine sulphate, of each 20 grams, in 450 grams of 90 per cent. alcohol; then add tincture of Cape aloes (1:5) 10 grams, and rectified eucalyptol 50 grams; agitate occasionally during 12 hours and filter. This mixture is very bitter and active, but not dangerous, and may be given in doses of 5 to 30 drops, mixed with milk, Spanish wine or gum syrup, or may be injected subcutaneously, or mixed with bran or starch, as clysters.—*Ibid.*, Oct. 30, p. 360.

An Antiseptic Liquid is obtained in France, according to Dr. Horteloup, by treating certain lavas with hydrochloric acid, whereby the silicates are decomposed. After standing, a thick, greenish, granular mass separates from a yellowish syrupy liquid, the latter containing aluminium chloride 61·75, potassium chloride 19·81, chloride of iron 15·09, calcium chloride 2·13, gelatinous silica 1·22 (the amount of water is not given). Diluted with 100 parts of water it has been applied with lint, and diluted with 1,000 parts of water it has been used as a wash. It does not affect the unbroken skin, is free from odor and is sold at the moderate price of 5 francs per liter.—*Rép de Phar.*, Dec., 1881, p. 562.

Salicylated Mouth Wash is prepared of salicylic acid 5 grams, alcohol 150 grams, attar of rose 2 drops, oil of cinnamon 5 drops, oil of peppermint 15 drops, oil of gaultheria 2 drops, distilled water 20 grams. It may be colored red with fuchsine, or with a mixture of equal parts of cochineal, cream of tartar and carbonate of sodium.—*Phar. Zeitung*, Sept. 21, p. 573.

Tinctura Caffeini Composita Dresdensis.—I. One part of caffeine dissolved in 100 parts of an aromatic liquor.—G. Berg.

II. Macerate for a week 100 grams of best flowering Pekoe tea in 1 kilo of diluted alcohol, sp. gr. ·893, and in the tincture dissolve 10 grams of caffeine.—C. Fingerhuth.—*Ibid.*, Oct. 5, p. 601.

Soluble Cacao, which was first prepared in Holland, and is known as Dutch cacao, is prepared from the seed, deprived of fat by pressure, by digesting the press cake with sodium or potassium carbonate, which treatment renders cellulose, starch and albuminoids more readily soluble in water. Otto Rueger prepares also soluble cacao mass which contains all the oil; the latter is first removed by pressure, the residue is treated as stated above and the fat is afterwards added again. Thus prepared it contains a somewhat larger percentage of ash, but yields a palatable beverage simply by stirring with hot water, without boiling. This mass was found to contain cacao-butter 47·73, nitrogenated compounds 12·3, ash 5·4, and in the latter alkaline carbonates 2·25 per cent. Cacao powder, similarly prepared, contained fat 30·45, nitrogenated compounds 19·94, ash 6·1, with alkaline carbonates 2·78 per cent.—*Phar. Centralhalle*, Nov. 17, 1881, p. 509.

Coating for Blackboards.—1. Sandarac 300, shellac 300, lampblack 200, ultramarin 30, ether 10 grams, 96 per cent. alcohol 4 liters. H. Schœneweg.

2. Shellac 200, camphor 80, lampblack 90, ether 800, alcohol 1,000 grams. C. Welcker.—*Phar. Zeitung*, 1881, No. 72.

Mel Rosæ.—E. Langlet recommends the following process: 100 grams of bruised red rose leaves are macerated for three hours with a mixture of water 160, alcohol 20 and ether 20 grams. The liquid is expressed, and preserved in a cool place. An infusion is now made of the rose leaves with 600 grams of boiling water, strained, clarified with white of egg, evaporated at a low temperature to 150 grams, and mixed with 600 grams of good and thick honey. The mixture is heated to the boiling point, the ethereal liquid is added in small portions, and the heat continued, without boiling, until the ether has been expelled; the honey is cooled, and filtered through paper.—*Rép. de Phar.*, 1881, p. 405.

Medicated Soaps.—The following formulas are published in "Phar. Centralhalle," Dec. 15, from "Seifenfabrikant," 1881, No. 23:

Tannin Soap.—Cocoanut oil 9 kilos is saponified with soda lye 4·5 kilos; 250 grams tannin dissolved in alcohol are then added, and finally the perfume consisting of Peru balsam 30 grams, oil of cassia and oil of cloves of each 10 grams.

Iodine Soap.—Cocoanut oil 10 kilos, lye of 38°B. 5 kilos and potassium iodide 500 grams dissolved in 250 grams water.

Gall Soap.—1·5 kilo of gall is mixed with 25 kilos of cocoanut oil,

and the latter saponified in the cold with 12·5 kilos soda lye of 38°B. The soap is colored with 350 grams ultramarin green, and perfumed with 75 grams each of oil of lavender and caraway.

Camphorated Sulphur Soap.—Cocoanut oil, 12 kilos; soda lye of 38°B., 6 kilos; sulphuretted potash, 1 kilo dissolved in water 0·5 kilo; camphor, 160 grams, to be dissolved in the melted cocoanut oil.

Infant Powder.—Dr. Klamann recommends as preferable to lycopodium, starch, etc., the following mixture for dusting in intertrigo, eczema and erythema of infants: Calcined magnesia 5·0, talc 25·0, salicylic acid 0·2, oleo-balsamic mixture gtt. x. The powder is a very effectual remedy and entirely harmless.—*Phar. Centralhalle,* Dec. 15, from *Deut. Med. Zeitg.,* 1881, No. 48.

Phosphorescent Powders, which have been recently employed in Europe for rendering signs, dials, etc., visible at night, are prepared by Pfeiffer, Fitz, Corty and Talleyrand Périgoid, by mixing 100 grams of calcium carbonate and phosphate, prepared by calcining oyster shells or cuttlefish bones, with 100 grams caustic lime, 25 grams calcined table salt, and adding to this mixture from 20 to 25 per cent. of sulphur and 3 to 7 per cent. of sulphide of calcium, barium, strontium or magnesium, previously exposed to the sunlight. A phosphorescent material prepared by incinerating marine algæ is also added for the purpose of increasing the illuminating power. The powders are rendered adhesive by means of varnish, collodion, paraffin, isinglass, etc., or may be incorporated in melted glass.—*Jour. de Phar. et de Chim.,* Oct., 1881, p. 352; *Jour. Phar. d'Als. Lorr.*

PRACTICAL NOTES.

By R. F. Fairthorne, Ph.G.

Extract of Vanilla.—So many formulas have been published by which this extract or tincture can be made, that it seems almost superfluous to offer another, yet, having tried many of them, I found none so satisfactory as the following:

℞	Vanilla bean, of good quality, . .	1 ounce
	Rock candy, . . .	2 ounces
	Alcohol, ...	9 fluidounces
	Water, ...	7 "

Cut the vanilla as small as possible with a sharp knife, then transfer it to an iron mortar and beat it and the rock candy into powder, which is to be put into a bottle with the alcohol and allowed to macerate

therein, with occasional agitation, for twenty-four hours. Then add the water, treat in the same manner for two days, and filter the extract, which will be found to possess a strong flavor and good color.

Extract of Herbs for Flavoring Soups, etc.—The addition of herbs to soup so as to flavor it pleasantly has suggested the advisability of making a preparation that will contain and retain unchanged the various flavors usually employed. The delicate aroma of many of them is impaired by time and exposure, and it is therefore desirable to preserve them, which is done when made into an extract in the following manner:

℞	Savory,	
	Sweet marjoram,	
	Basil, ...	each 2 ounces (troy)
	Sage,	
	Black pepper, . .	each ½ ounce "
	Thyme, . . .	1 ounce "
	Celery seed, . . .	1½ drachm
	Alcohol, . . .	3½ pints
	Water, ...	½ pint

Reduce the dry ingredients to a coarse powder. Pack them tightly in a percolator, after having moistened them with six fluidounces of the mixture of alcohol and water. Pour on the remainder of the menstruum. As soon as the liquid ceases to pass through, displace with diluted alcohol sufficient to make the product measure four pints. This will be found a very palatable addition to soups and gravies.

As delicate persons frequently complain of the insipidity of beef-tea, or infusions of extracts of meat, I have found that their objections can be overcome by mixing 4 or 5 drops of the "extract of herbs" with each wineglassful of the tea, so that they can take it with relish. For this reason I think it is a desideratum for the druggist to be able to offer to such customers a preparation like that described above. Some invalids, however, prefer the flavor of celery, which can be made by the following formula, and the same quantity used as of the former:

℞	Celery seeds (bruised), . .	6 drachms
	Alcohol, . . .	14 fluidounces
	Water, ...	2 fluidounces

Macerate for 2 days and filter.

Marking Pill Cutting Machines.—One of those small contrivances that add to the convenience of the dispenser of prescriptions consists of marking each groove of the pill machine consecutively, thereby saving the time required to count them, which is often quite desirable,

especially when the pills are wanted in a very short time. It is most convenient to begin marking the numbers from left to right. This can be readily done by using a fine pen and indelible ink, which will remain permanent and stand any amount of washing. A good plan is to mark each groove at the top, except every fifth one, which is best to have the number placed at the bottom, in order to make the numeration more easily read. This will be found especially desirable for the pill machines that cut small pills, such as one grain, so that the fifth, tenth, fifteenth, twentieth, and twenty-fifth grooves can be distinguished at a glance. The ink used should be made with nitrate of silver.

Antiseptic Cologne.—

℞	Cologne, ...	fl. oz. 8
	Chloral hydrate, ...	dr. 2
	Quinine (alkaloid), ...	gr. 10
	Carbolic acid (pure), ...	gr. 30
	Oil of lavender, ...	drops 20

Having frequently noticed that when carbolic acid is mixed with chloral, the odor of the former is either covered or removed, I prepared the cologne as above, and found that it was by no means disagreeable. It can be used in the form of spray, or on the handkerchief, and, as it contains three well-known antiseptics, it may possess some valuable properties. It was made up, however, several years ago, to supply a popular demand for such an article, and gave satisfaction, at least to some who used it; but whether from increasing the confidence of those using it, in the belief of its prophylactic effects, or from its really possessing such, I am not able to state, but must leave it for others to determine.

Solution of Citrate of Magnesium—An improvement can be made in making this solution by using calcined magnesia instead of the carbonate. This is due to the fact that when light calcined magnesia is employed, the citrate is free from a peculiar flavor that is scarcely capable of description, except by the term earthy. In the following receipt the same amount of citric acid is employed as called for by the formula given in the U. S. Pharmacopœia, and yet if any druggist will take the trouble to make it by this receipt, he will find a marked difference in the taste of the solution. He will also find that a beautifully clear preparation is obtained.

℞	Light calcined magnesia, . . .	dr. 7, gr. 55
	Citric acid, ...	troy oz. 4, dr. 1, gr. 45
	Bicarbonate of sodium, . . .	dr. 1, gr. 40
	White sugar, ...	troy oz. 6
	Oil of lemon, ...	drops 3
	Bicarbonate of potassium, . .	q. s.

Water sufficient to make 50 fluidounces.

Dissolve the citric acid in 20 fluidounces of hot water; add the magnesia, and when solution is effected add the sugar, then the bicarbonate of sodium, the oil of lemon and cold water. Filter, and of this put 10 fluidounces in a suitable bottle, with 40 grains of bicarbonate of potassium. Cork tightly and tie over as usual.

CHEMICAL NOTES.

By Prof. Samuel P. Sadtler, Ph.D.

Inorganic Chemistry.—*On the freezing point of Sulphuric Acid of different degrees of concentration.*—Prof. G. Lunge has made a series of careful experiments on the question of the degree of cold necessary to bring about the formation of crystals in sulphuric acid of different specific gravities. According to Marignac, pure sulphuric acid, H_2SO_4 (frequently called monohydrated sulphuric acid), fuses at +10·5°C.; the strongest acid obtainable by evaporation or boiling, which contains 98 to 99 per cent. of monohydrated acid at the most, being said to deposit these crystals of monohydrate when cooled to 0°C., although frequently that point is reached without any change whatever. It is known too that the common strong sulphuric acid of commerce, that of 66° Baumé, which contains 95 to 96 per cent. of monohydrated acid cannot be brought to solidify even by a freezing mixture. However, the so-called second hydrate, $H_2SO_4+H_2O$, repeatedly crystallizes at +8°C., and this often happens in practice. Acids which approximate this composition (the second hydrate contains 84·5 per cent. H_2SO_4, and has a sp. gr. of 1·778 or 63·2° Baumé), when exposed to the frost in winter time may burst the carboys.

Prof. Lunge has made a series of tests on acids of different strength, using a mixture of three parts ice and one part common salt in which the thermometer sank to —20°C. The results are appended in tabular form:

Sp. Gr. at 50°C.	Degree Baumé.	Freezing-Point.	Fusing-Point.
1·671	58·	liquid at —20°C	......
1·691	59·	......	......
1·712	60·05	......	.....
1·727	60·75	—7·5°	—7·5°
1·732	61·	—8·5°	—8·5°
1·749	61·8	—0·2°	+4·5°
1·767	62·65	+1·6°	+6·5°
1·790	63·75	+4·5°	+8· °
1·807	64·45	—9·0°	—6· °
1·822	65·15	liquid at —20°C	......
1·842	56·	......	......

—*Ber. der Chem. Ges.*, xiv, p. 2649.

ORGANIC CHEMISTRY.—*On the Production of Oxalic Acid from Paraffin Oil.*—J. Galletly and J. S. Thomson treated a paraffin oil, sp. gr. about ·800, obtained by the destructive distillation of shale with twice its volume of nitric acid, sp. gr. 1·3. The action is at first violent, but has to be completed with the aid of a gentle heat. After the reaction is finished the liquid separates into three layers. The lower one, consisting of the excess of the acid, on evaporation at a gentle heat, yielded a crop of yellow crystals which, after recrystallization, were obtained in a colorless condition. They proved to be pure oxalic acid. The authors identified the body by its reaction and analyses of the acid and its calcium salt.—*Chemical News*, Dec. 9, 1881, p. 284.

On the Preparation of Strontium Saccharate in the Working of Molasses and Syrups.—C. Scheibler has patented a process for the extraction of sugar from beet root molasses by the aid of strontium salts, which are now found so abundantly in Germany (see this Journal, 1881, p. 607). At a boiling temperature, either with or without the aid of pressure, tribasic strontium saccharate is precipitated, is separated from the liquid at the same temperature, and washed with hot water. This strontium saccharate is decomposed by water at a lower temperature into a less basic saccharate and free strontium hydrate. The former can then be used again in the separation of sugar from fresh portions of juice. This strontium process is to be used as a substitute for the "elution" process with calcium saccharate. —*Chem. Industrie*, Oct., 1881, p. 302.

On Some New Dye-colors, Compounds of Resorcin with Vegetable Acids.—The brilliant result of Baeyer's experiments on the union of phenols like resorcin with polybasic acids like phtalic acid, giving to the world the beautiful dyes fluorescein, eosin, cœruleine, and galleine have induced other experimenters to investigate the behavior of resorcin at high temperatures with several of the vegetable acids. Thus Fraude has examined the question of forming a compound of resorcin with tartaric and citric acids. One molecule of tartaric acid was heated for two hours to 165° to 168°C. with two molecules of resorcin with the addition of 1 per cent. of sulphuric acid. The result was a resinous mass, which after purification by solution in warm soda lye, precipitation with hydrochloric acid, repeating the operation if necessary, and then filtering through bone-black and evaporation over sulphuric acid, yielded a dark olive-green lustrous powder. This dissolves with

deep red color in alkaline carbonates, ammonia and dilute alkalies. The solutions, moreover, show a striking fluorescence like that seen with resorcin-phtalein. The bromine compound, obtained by adding alcoholic bromine to an alcoholic solution of the color, dissolves in alkaline carbonates with a fine crimson-red color.

The corresponding citric acid compound was obtained in a similar manner. The magnificent blue fluorescence of the red alkaline solution is even more intense than in the tartaric acid compound. The reaction with tartaric acid will take place even without the addition of sulphuric acid. Fraude calls these compounds tartreïns and citreïns, analogous to phtalëins.

Adolph Claus has also obtained resorcin-oxalëin. This compound only forms under strong pressure. By heating anhydrous oxalic acid and resorcin in open vessels it cannot be produced, and even in closed tubes the mixture has to be heated to 200°C. to produce the desired reaction. One molecule of oxalic acid and one of resorcin were used. The oxalëin was precipitated from the dilute alcoholic solution by addition of water or was gotten by evaporation as a red powder tolerably soluble in ether and possessing a formula $C_{20}H_{14}O_7$. It dissolves in alkalies whether in aqueous solution or in alcoholic with an intensely red or brownish color. In dilute solutions of light yellowish color it shows a strong moss-green fluorescence. A penta-bromine derivation was gotten as a dark-fiery red powder.—*Ber. der Chem. Ges.*, xiv, pp. 2558 and 2563.

On Peppermint Camphor (Menthol) and some of its Derivatives.—R. W. Atkinson and H. Yoshida have given menthol a careful examination. After repeated purification by distillation, careful pressing between filter-paper, etc., the authors obtained menthol melting at 42·2°C., solidifying at 40·3°C., and boiling at 212°C. Mr. Moriga has shown that menthol, when heated with acid bichromate solution at 120°C., yields an oil boiling at 404°C., having the composition of menthone, $C_{10}H_{18}O$ ("Jour. Chem. Soc.," March, 1881). The authors have repeated these experiments, using larger quantities. Menthone is a colorless mobile liquid, neutral to test paper, soluble in alcohol, chloroform, benzene and bisulphide of carbon; insoluble in water. If a solution of menthone in petroleum naphtha be heated with sodium, the solution formed decomposed by carbonic acid, the product shaken with water, rapidly separated from the oily layer, and set aside, minute crystals of menthol are obtained. Menthol, therefore, stands

to menthone in a similar relation to that which borneol stands to camphor. The menthol thus prepared from menthone melts at 42·2°C., but has a rotatory power of —39. The authors then prepared menthene, $C_{10}H_{18}$, by heating menthol with zinc chloride; the crude product was purified by careful fractionation and long digestion with sodium. The pure product distilled over constantly at 167·4°C. Menthene is a colorless liquid, moderately soluble in ether and alcohol, more soluble in benzene, turpentine and petroleum. By treating menthol with hydriodic acid, distillation, treatment with caustic soda, sodium, etc., a colorless hydrocarbon was obtained, which consisted chiefly of $C_{10}H_{16}$, with a small quantity of $C_{10}H_{18}$ or $C_{10}H_{20}$.—*Chem. News*, Dec. 9, 1881, p. 283.

On the Transformation of Morphine into Codeines and Homologous Bases.—The formula of morphine, $C_{17}H_{19}NO_3$, and that of codeine, $C_{18}H_{21}NO_3$, show that these two bases differ from each other by CH_2, and that codeine may be considered as derived from morphine by the substitution of a CH_3 group for one atom of hydrogen. How tried, in 1853, the action of methyl iodide upon morphine; but he obtained an isomer of the hydriodate of codeine, presenting none of the characteristics of an alkaloid salt. More recently, Matthiessen and Wright have determined something of the relation of morphine to codeine. By heating morphine with hydrochloric acid, they extracted the elements of water, and obtained as a result apomorphine. Codeine, submitted to the same treatment, likewise yielded apomorphine and also methyl chloride. There is, therefore, present in morphine an alcoholic OH group, and in codeine a group OCH_3. E. Grimaux, in considering these reactions, observed that morphine resembled the phenols in its characteristics, and it occurred to him that codeine might be the methyl ether of morphine, considered as a phenol. It then only remained to try this transformation by the usual means, viz.: heating with alcoholic potash or soda. Morphine was dissolved in alcoholic soda solution, the proportions being one molecule of morphine to one molecule of soda, and a quantity of methyl iodide, corresponding to two molecules, added. On gently heating the mixture, brisk action took place, which ceased after a few minutes. The reaction took place in the manner expected; but was complicated by a secondary reaction, and in the place of free codeine there was obtained the iodomethylate of codeine, $CH_3I,C_{17}H_{18}NO_3(OCH_3)$. The com-

pound thus obtained was identical in every respect with the addition product of codeine and methyl iodide.

On repeating the experiment, reducing the proportion of methyl iodide to half that employed in the first operation, free codeine was obtained, although in small amount—2 grams of hydrochlorate of codeine from 20 grams of morphine. The codeine thus obtained was in every respect identical with that obtained from opium. Upon operating with ethyl iodide, instead of the methyl compound, there was obtained a new base, $C_{19}H_{23}NO_3$, homologous with codeine. This base can be obtained in fine crystals, fusing at 83°, readily soluble in ether and alcohol, and a little less soluble in boiling water than codeine. To this class of ethers of morphine M. Grimaux proposes to give the name of *codeines.*—*Comptes rendus*, 92, 1140.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

Euphorbia Lathyris, Lin.--This plant, known as caper spurge, is often cultivated as an ornamental plant, and to a certain extent naturalized in the United States. E. Sudour and A. Caraven-Cachin, having observed the effects of the seeds, state that they are drastic, purgative and contain the active principle in very variable proportion. An emetic effect always precedes the purgative action, even if the dose be small, and may manifest itself in 45 minutes, or may be retarded for three hours. The seeds have an irritating action upon the mucous membrane of the digestive canal, principally in the larger intestines and in the back-throat, if mastication has been sufficiently prolonged. The toxic effects, produced by large doses, may be divided into three periods: 1, the cold stage (vomiting, diarrhœa); 2, the stage of excitation (nervous affects, vertigo, delirium); 3, the stage of reaction (heat, abundant sweating). Opiates are the best and most prompt remedies against these effects. In doses of 6 to 12 seeds, which are recommended in several works, violent gastro-intestinal irritation may be produced. The drug being very active, and frequently variable, should not be employed in medicine.—*Rép. de Phar.*, Nov., 1881, pp. 526, 527.

A New Jasmine from Samoa is described by Ferd. Von Mueller, who regards it as having not merely horticultural value, but also for perfumery purposes. The following may be offered as a diagnostic limitation:

Jasminum Betchei.—Tall-climbing, glabrous; leaves opposite, unifoliolate; leaf-stalks, together with their stalklets, rather short; leaflets large, roundish-ovate, acutely narrowed at the summit, of chartaceous consistence, three-nerved towards the base, thinly and distantly veined; peduncles mostly axillary, bearing 1 to 3 flowers on long pedicels; teeth of the calyx 4 to 5, deltoid, minutely pointed, much shorter than the tube; corolla very long, pure white, divided not much beyond the middle into 6 to 10 lanceolate-linear gradually acuminated lobes, its tube narrow, only slightly widened upwards; anthers elongated, linear-cylindrical, short-pointed, on very thin filaments near or above the middle of the tube; style deeply enclosed; fruit-calyx not angular; fruitlets very large, 1 to 3 seeded; pericarp coriaceous, outside nearly black. On the edges of the forests in the lower mountain-region of Apia—only once found.—*Chem. and Drug., Austral. Suppl.*, August, 1881, p. 29.

The Fruit of Leptomeria acida, or Australia currant, according to E. H. Rennie, owes its intensely sour taste chiefly to malic acid, which, besides small quantities of citric and tartaric acids, is present to the amount of more than 40 per ct. in the residue obtained by neutralizing the juice with sodium carbonate and evaporating to dryness. The ash contains a considerable quantity of patassium carbonate with mere traces of calcium carbonate.—*Jour. Ch. Soc.*, 1881, p. 1033; *J. Roy. Soc., N. S. W.*, xiv.

The bark of Persea Lingue (*Laurus caustica*) is described by P. N. Arata as occurring in commerce in curved pieces 10 to 15 cm. broad and 5 to 9 mm. thick; it has a peculiar aromatic odor, the sp. grav. ·896, a rugged outer surface, a dark orange color, lighter around the irregular cracks and variegated with zones of white spots, and a smooth inner surface with slight longitudinal ridges and of a color like that of the outer surface. The tree is 25 to 30 feet high, has a stem about two feet in circumference, and is widely diffused in Chili between the provinces of Acongaqua and Chiloé, and in the Argentine Republic between Limay and Neuquen. The bark was found to contain moisture 2·53, constituents soluble in ether (resin, volatile oil, little tannin) 17·71, constituents soluble in alcohol (tannin) 24·63, constituents soluble in water (proteids, gum, sugar, etc.) 14·55, constituents soluble in hydrochloric acid (calcium oxalate, etc.) 2·63; wood fibre and loss 37·95 per cent. Lingue-tannin $C_{17}H_{17}O_9$ is reddish white, soluble in alcohol, acetic ether, acetone, methyl alcohol, slightly solu-

ble in water, gives a green color with ferric salts, and yields on dry distillation water and catechol, on treatment with nitric acid oxalic and picric acids, and on heating with potassa solution phloroglucol and probably protocatechuic acid; it is analogous to the tannin of quebracho colorado, catechu, etc.—*Ibid.*, 602; *Anal. Soc. cientif. Argent.*, x, 193.

Chinese and Japanese Nutgalls.—C. Hartwich characterizes four kinds of these nutgalls as follows:

A. Galls smooth, flat, oftenlobed, with stomata and without resin-ducts: Kakrasinghu-galls, from *Rhus Kakrasinghu*, Royle.

B. Galls more or less pubescent; stomata absent or very rarely present; resin ducts present.

a. Galls slightly pubescent, always unbranched, roundish-oblong, somewhat plum-shaped, the apex often prolonged into a short point, and this occasionally curved; parenchyma at first tangentially elongated, but beyond the middle of the shell radially elongated; starch granules unaltered: pear-galls.

b. Galls very pubescent, mostly branched; parenchyma tangentially elongated, internally only isodiametric.

1. Pubescence dense, light-brown; branches numerous; starch granules unaltered: Japanese galls.

2. Pubescence less dense, greenish-brown; branches less numerous or almost absent; starch pasty: Chinese galls.—*Archiv d. Phar.*, July, 1881, p. 31–34.

Quebrachitannic acid, according to P. N. Arata, is best prepared from the so-called gum of the quebracho colorado, *Quebrachia* (*Loxopterygium*) *Lorentzii, Grisebach.* The gum is purified by treatment with alcohol, then dissolved in boiling water, and the hot filtered liquid set aside, the reddish deposit is collected on a filter, the mother liquor precipitated by a mineral acid or by table salt, and the precipitates are rapidly washed, pressed between bibulous paper and dried over sulphuric acid. The tannin is pale red, amorphous, yields a cinnamon-colored powder, is readily colored darker by alkalies, or by prolonged boiling of its solution, has an astringent taste, and is insoluble in carbon bisulphide, chloroform, oil of turpentine and benzene. Its aqueous solution yields white precipitates with gelatin, albumin, alkaloids and lead salts, the latter, on heating, acquiring a rose and then a chocolate color; with ferric chloride, a green liquor is produced, changing to dark red, and on the addition of sodium acetate, to

black. On dry distillation the tannin yields catechol; strong nitric acid converts it into oxalic and picric acids, and by fusion with potassa it is resolved into phloroglucol and protocatechuic acid. The tannin contains C 52·52, H 5·11.

Quebrachicatechin (see "Am. Jour. Phar.," 1879, p. 152) extracted by ether from the mother liquor from which quebrachitannin has been precipitated, is freely soluble in alcohol and ether, sparingly soluble in hot water, gives rose-colored precipitates with basic lead acetate and with mercurous nitrate; blackish with a mixture of ferrous sulphate and sodium acetate; reduces silver nitrate and gold chloride; is colored yellow by nitric acid, red by sulphuric acid, yellowish by sodium hypochlorite, green by Fehling's solution; does not precipitate gelatin or the alkaloids.—*Jour. Chem. Soc.*, Dec., 1881, 1152, from *Anal. Soc. Cient. Argent.*, 1879.

New Cinchona Alkaloids.—An alkaloid has recently been isolated from cuprea bark by B. H. Paul and A. J. Cownley, W. Geo. Whiffen, and D. Howard and J. Hodgkin, the papers having been published in "Phar. Jour. and Trans.," Dec. p. 17, 1881, 497, and "Chem. News," Dec. 23, p. 301. The alkaloid resembles quinine in the sparing solubility of its sulphate in water, in the emerald green color produced by chlorine water and ammonia, in the fluorescence of its solution, and in its not being precipitated by the *cautious* addition of potassium iodide; but differs from it in being soluble in ether only, when *freshly* precipitated, and in crystallizing from this solution in thin plates of a pearly lustre. The cold saturated solution of its sulphate in water is precipitated by Rochelle salt (like quinidine and cinchonidine).

C. H. Wood and E. L. Barret ("Chem. News," Jan. 6, 1882) have not succeeded in getting some of the new base from the alkaloid products of several hundred samples of cuprea bark; and they call attention to a peculiar behavior of the mixed alkaloids, quinine and quinidine, which they had at first observed with the products of cuprea bark, this bark being rich in quinidine. The etherial solution of the total alkaloids would frequently furnish a notable quantity of crystals that did not resemble those of any of the known cinchona alkaloids obtained under like circumstances. The previous analysis not having revealed the presence of a distinctive base, a mixture of two grains of pure quinine and one grain of pure quinidine was dissolved in ether, and yielded an abundant crop of the same crystals,

and these, on being converted into neutral sulphate, furnished a quantity of pure sulphate of quinine, while the mother liquor contained quinidine.

Perhaps the easiest way of obtaining this compound is to dissolve one part of pure quinine in 30 or 40 parts of ether, and add to the liquid a saturated etherial solution of a like quantity of pure quinidine; a crystalline precipitate forms in abundance, which is much less soluble than either of its constituents, 100 cc. of ether at common temperatures dissolving only 0·5 gram of it.

A new alkaloid, called *cinchonamine*, has been obtained by Arnaud ("Rép de Phar.," Nov., 1881, p. 507–509) from a bark of Santander, Columbia, which seems to belong to the cuprea barks and which is described as being very dense, of a deep red-brown color and having a resinous fracture. The hydrochlorate of the new alkaloid is easily separated from the cinchonine, also present, by its sparing solubility in cold water. The alkaloid is insoluble in cold water, dissolves in 100 parts of ether, sp. gr. ·720, and in 31·6 parts of 90 per cent. alcohol, crystallizes from boiling alcohol in colorless shining anhydrous prisms, melts at 195°C., is dextrogyre (dissolved in alcohol = +117·9), has a slight bitter taste and yields sparingly soluble neutral salts, which in acid solution are not fluorescent. Its composition is $C_{19}H_{24}N_2O$.

O. Hesse ("Phar. Jour. and Trans.," Dec. 24, 1881, p. 517) has found in a cuprea bark considerable quantities of aricine and cusconine, some cinchonine, and a small quantity of an alkaloid that had a great resemblance to cinchonine, though in several points differing essentially from it. The bark corresponded in fracture and hardness to the true cuprea bark, but had a pale reddish color. The cinchonamine of Arnaud stands without doubt in very near relation to aricine.

Hesse ("Berichte," 1881, p. 1683–1685) has also obtained a new alkaloid, *cinchamidine*, $C_{20}H_{26}N_2O$, by fractionally precipitating the mother liquor from homocinchonidine sulphate with neutral sodium tartrate, when the new alkaloid is contained in the last precipitates. In the pure state, the alkaloid crystallizes in colorless scales and flat needles, or from strong alcohol, in short thick prisms, melts at 230°C., is levogyre (—98·4°) and its acid solutions are neither fluorescent nor do they yield a green color with chlorine and ammonia. Its sulphate has about the same solubility as the sulphate of homocinchonidine, and the alkaloid is frequently and in notable quantities present in commercial cinchonidine.

Lycopodine, $C_{32}H_{52}N_2O_3$, is a new alkaloid obtained by K. Boedeker from the aqueous solution of the alcoholic extract of *Lycopodium complanatum*, Lin., by precipitating with basic lead acetate, treating the filtrate with sulphuretted hydrogen, adding an alkali and agitating with ether. The alkaloid is crystalline, melts at 114°C., is freely soluble in alcohol, ether, benzene, water and amyl alcohol, and has a very bitter taste; its hydrochlorate crystallizes with $1H_2O$.—*Ann. d. Chem.*, ccviii, 363–367.

Soja hispida, Moench.—The seeds of this leguminous plant which are used in India in the preparation of a sauce called *soy*, were found by A. Levallois to contain a peculiar slightly sweet sugar, which on precipitation by ether from its alcoholic solution forms a very deliquescent mass. It does not reduce Fehling's solution, yields glucose on treatment with dilute mineral acids, has a rotary power of about +115, and after inversion of +35, ferments readily with yeast and with nitric acid yields mucic and oxalic acids. In the formation of mucic acid the sugar resembles melitose, and it has also some analogy with cane sugar.—*Rép. de Phar.*, Nov., 1881, p. 518.

Myronic Acid in the Seeds of Brassica Rapa.—H. Ritthausen has found a considerable proportion of potassium myronate in yellow and brown turnip seeds from India, as well as in such grown in East Prussia, and the seeds and press cakes yielded oil of mustard. However, rape seeds, from Brassica Napus, grown in Russia and in Prussia, were free from myronic acid, and yielded not a trace of oil of mustard.—*Phar. Ztg.*, Oct. 26, 1881, p. 645.

Reaction of Oil of Peppermint.—Flückiger observed (1871) that oil of peppermint acquires a blue-green color with nitric acid, sp. gr. 1·2. In 1878, A. Schack observed that an alcoholic solution of the oil will gradually acquire a copper-green color in the presence of salicylic acid. On adding the oil to melted salicylic acid a blue-green mass is at once produced, soluble in alcohol. All acids experimented with, including carbolic acid, but not carbonic acid under ordinary pressure, give a similar reaction, particularly in the presence of alcohol, application of a moderate heat being necessary in some cases. A mixture of 1 cc. glacial acetic acid and one drop of oil of peppermint, slightly warmed, shows the color very beautifully, it being blue in transmitted and blood-red in reflected light, and after diluting with alcohol until the blue tint has nearly disappeared, the red reflection is still observed in the sunlight on pouring the liquid out in a thin stream, and looking vertically into it. Menthol and oil of crisped mint do not show the reaction.—*Archiv d. Phar.*, Dec., 1881, pp. 428–430.

RESORCIN AND ITS ALLIES.

For the introduction of many new therapeutic agents we are indebted to the researches of German chemists. Resorcin, for example, has of late attracted considerable attention both as an antiseptic and antipyretic. It was discovered about fifteen or twenty years ago, by Hlasiwetz and Barth of Vienna, who obtained it by fusing galbanum resin with potash. Being isomeric with orcin, a substance found in the lichens used for making litmus, and having been first obtained from a resin, it received the name of resorcin. It is also known as resorcenal, whilst its full chemical title is metadioxylbenzene. Its formula is $C_6H_4(HO)_2$; and it is isomeric with *hydrochinon*, a substance recently introduced by Brieger as an antipyretic. Resorcin is now rarely prepared from galbanum, newer and better modes of manufacture having been recently introduced. It is economically obtained by mixing with chalk the wash and mother liquid left in making brazilin from Brazil-wood, evaporating to dryness, and subjecting the residue to dry distillation; or it may be made by passing the vapour of benzol through sulphuric acid, dibenzolsulphuric acid being formed. It is used in large quantities in the manufacture of eosine and other coal-tar dyes.

Resorcin is a neutral crystalline body, soluble in water, alcohol, ether, and in fact, in all fluids with the exception of chloroform and bisulphide of carbon. It crystallizes only from very concentrated solutions, in beautiful little feathery crystals. When quite pure and freshly prepared, it is colorless; but, on exposure to the air, it quickly acquires a pinkish color. It melts at 210° Fahr., boils at 570° Fahr., and distils without residue. It has a strong, peculiar, sweet, and somewhat unpleasant irritating taste. When thrown on the fire, it burns with a bright flame. A very characteristic test is afforded by dissolving a few grains in fuming sulphuric acid. An orange-red solution is formed, which gradually darkens, and changes after a time, first to greenish-black, and then to pure blue, becoming purple-red on gently warming.

From a consideration of the atomic relations existing between resorcin and phenol, Dr. Julius Andeer, of Würzburg, was led to suspect that they might have a similar physiological action, and such, on investigation, proves to be the case. A 1 per cent. solution of pure resorcin arrests almost all forms of fermentation. Blood, urine,

infusion of pancreas, and other substances which ordinarily quickly undergo decomposition, can be kept for an almost unlimited time by the addition of a few grains of this new antiseptic. Even when decomposition has already set in, resorcin speedily arrests it. Wounds of the cornea, conjunctiva, and the mucous membranes, when irritated and inoculated with decomposing organic matter, speedily heal without the production of constitutional symptoms, if cauterized with resorcin. Its application has been found equally efficacious in the treatment of erysipelas and subcutaneous abscess. Dr. Constantine Paul finds that even weak solutions speedily and effectually disinfect typhoid stools. It is a true process of disinfection, he says; for resorcin itself, being odorless, does not act as so many so-called disinfectants do, by substituting one smell for another. Of such great value does Dr. Paul consider resorcin as a deodorizer, that, in diarrhœa, he often uses it as an enema, so as to disinfect the stools before they are passed.

The action of resorcin on the lower animals has as yet been but little investigated; but it would appear from the experiments of Dujardin Beaumetz and Callais, that, in dogs and rabbits, it exerts a powerful action on the nervous centres, producing epileptiform convulsions. The respiratory movements become rapid and superficial, and usually the heart continues beating for some time after breathing has ceased. Professor Lichtheim of Berne, found that in a man it produced giddiness and buzzing in the ears, the face became flushed, the eyes bright, and the pulse and respiration were quickened. In from ten to fifteen minutes the skin became moist, and soon the whole body was bathed in perspiration. It has been said that one of the great advantages of resorcin is that it is destitute of toxic properties; but, from some observations recently recorded by Dr. Murrell, it would appear that, in large doses, it is capable of producing very decided symptoms. The patient was a young woman who suffered severely from asthma. After a few preliminary trials with smaller doses, she was given, during a severe paroxysm, half a drachm in a little milk. She experienced no difficulty in taking it, her breathing became easier almost at once, and in half an hour she fell asleep, sleeping comfortably for three hours, when she awoke free from shortness of breath. The urine passed on the following day was of an olive-green color, as if carbolic acid had been taken. The same dose was given on two other occasions during a paroxysm, but failed to afford relief. The dose was then increased to a drachm. Immediately on taking the powder, she experienced a

decided sensation of giddiness; this was followed by heaviness over the eyes, and drowsiness; the dyspnœa was relieved, and, in a quarter of an hour, she was fast asleep. This was tried on four different occasions, and always with the same result. The pupils were not affected, there was no diplopia, and no tinnitus aurium. The action on the urine was more marked with the larger doses. She was now given a drachm and a half, without the production of symptoms other than those already mentioned. On increasing the dose to two drachms, decided effects were produced. The patient complained that it flew to her head, and she felt giddy, and had "pins and needles" all over. In a few minutes she became insensible, and was found lying on her side faintly moaning, her eyes closed, and her hands clenched. She was in a profuse perspiration from head to foot; there was complete loss of voluntary power and reflex action, the pulse at the radials was weak and thready, and the temperature in the axilla was only 94° Fahr. Restoratives were applied, consciousness was soon restored, and the temperature gradually returned to the normal. It is stated that the resorcin first used in this case was impure, being contaminated with carbolic acid; but the specimen from which the two-drachm dose was taken had been specially prepared, and contained not more than 2 to 3 per cent. of impurity.

Resorcin is not absorbed by the healthy unbroken skin; and, even when rubbed in, it produces no sign of irritation. Hypodermic injections of a 2 per cent. solution sometimes give rise to cramps and painful twitchings, but abscesses are of rare occurrence. Therapeutically, it is recommended in a great number of diseases. It is said to be invaluable as a surgical dressing, incised and punctured wounds always healing by first intention when treated by the 1 per cent. solution. In the form of spray—½ per cent.—it is claimed for it that it possesses the following advantages over carbolic acid: It is more soluble in water, it is almost destitute of smell, its toxic action is slight, and it is less irritating. It is recommended as a caustic for cancerous and syphilitic sores of the mucous membranes, and it is said that it destroys the diseased tissues thoroughly and painlessly. Given in large doses, it has been used in intermittent fever, but the recorded cases are too few in number to enable us to express an opinion as to its value. As an inhalation, it is recommended in diphtheria and in diphtheritic affections of the throat. A 1 per cent. solution dropped into the ears arrests the offensive discharge from which scrofulous children so frequently suffer.

Its antipyretic action renders it valuable in all febrile diseases; and in Germany it has been freely and extensively administered in typhus and typhoid, in acute rheumatism, pneumonia, erysipelas, and phthisis. The fall of temperature, however, is usually of briefer duration than after the administration of quinine or salicylic acid. It is sometimes used as an injection in gonorrhœa and gleet, and in vaginitis and cystitis. Andeer considers that it is of inestimable value in all affections of the stomach, and especially recommends its administration in gastric ulcer, from its peculiar action on mucous membranes, which heal without the formation of a cicatrix after cauterization with resorcin. The usual dose for an adult is from 15 to 20 grains, three or four times a day, but larger quantities are often given. It may be taken in the form of a mixture dissolved in water, and flavored with a little glycerin and syrup of oranges. It is sometimes given in powder in a wafer or empty capsule. In the case of an overdose, emetics with olive oil, and a hypodermic injection of atropia, would be the appropriate remedies.

Hydrochinon, another member of this group, possesses even more decided antipyretic properties than resorcin, 3 grains reducing the temperature very quickly, without the production of any unpleasant symptoms. It can be used hypodermically, as it is quite free from caustic properties, and produces no more irritation than so much water. It is recommended that 10 per cent. solution should be employed, and that 5 or 10 minims should be injected into each arm.

Chinoline is another, although a somewhat more distant, relative of resorcin, whose properties have recently been investigated by Dr. Julius Donath of Baja, in Hungary. Its formula is C_6H_7N, it being the first of a homologous series of eight similarly constituted alkaloids, each member of which differs from its predecessor by the addition of CH_2. It is a transparent, colorless, oily fluid, having a penetrating odor resembling bitter almonds, and a hot, pungent taste like peppermint. It is but sparingly soluble in cold water, but dissolves more freely in hot. It mixes in all proportions with alcohol and ether, and is a solvent for sulphur, arsenious acid, and camphor. It is manufactured on a large scale from coal-tar, chinoline and aniline being found almost without other admixture in the last portions of the distillate known as "dead oil." It is an energetic bacteria poison, a one-fifth per cent. solution arresting fermentation in Bucholz's fluid. In the same proportion it prevents lactic acid fermentation, although it exerts

little, if any, action on yeast-cells. It forms several salts, some of which seem destined to play an important part in the treatment of disease. The tartrate and salicylate are both colorless, the former occurring in the form of small acicular crystals, whilst the latter is an amorphous powder. They both have a peculiar pungent smell, and a somewhat irritating, though by no means an unpleasant taste. From the observations of Dr. Donath, of Dr. Leopld Loewy of Fünfkirchen, and of Dr. Salkowski of St. Petersburg, it would appear that the tartrate of chinoline possesses antiperiodic properties of the highest order; and there is reason to suppose that it will, to some extent, replace quinine, especially as it can be turned out at one-fifth the price, the dose being almost the same. Dr. Loewy records forty cases of intermittent fever successfully treated with the new remedy, besides many cases of neuralgia. The only objection to its use is that it occasionally upsets the stomach.

It must be remembered that, although these remedies are being extensively tried both in France and Germany, we have as yet had but little experience of their use in this country; and, until their physiological action has been more fully investigated, a certain amount of caution should be exercised in giving the larger doses that have been recommended.—*Phar. Jour. and Trans.*, Dec. 21; *Brit. Med. Jour.*

VARIETIES.

Effects of removing Mountain Forests.—Attention has long been given to devising means to limit the ravages of these torrents, which ruin the land, threaten estates, destroy roads, and sometimes even compromise the existence of villages. Walls have been built along the banks to protect them, or across the streams to allay the force of the waters. The most efficacious means, however, as yet discovered, has been to maintain the woods on the slopes of the mountain. The effect of cutting away the trees in promoting the formation of torrents has not been doubted by the inhabitants of mountainous regions, and is clearly set forth by M. Surrell, who says: "When we examine the tracks in the midst of which torrents of recent origin have been formed, we perceive that they have in all cases been despoiled of their trees and bushes. If, on the other hand, we examine hills whose sides have been recently stripped of wood, we observe that they are cut up by numerous torrents, which have evidently been formed very lately. Here is a remarkable double fact: wherever there are recent torrents there are no longer forests, and wherever the ground is cleared these torrents are formed; and the same eyes that see the woods

fall on the declivity of a mountain may see appear there immediately a multitude of torrents."

The disastrous consequences of removing the woods from the Alps began to attract attention in the last century, and have since been discussed in many publications and official reports. In 1853 the prefect of the department of the Lower Alps said in a report to the Minister: "If prompt and energetic measures are not taken, it will be almost possible to designate the precise moment when the French Alps will become a desert. The period from 1851 to 1853 will produce a new diminution in the number of the population. In 1862 the Minister will remark a continuous and progressive reduction in the number of hectares devoted to agriculture; each year will aggravate the evil, and in a half-century France will count more ruins and one department less." The departments of the Upper and Lower Alps actually lost thirty thousand inhabitants, or one-ninth of their population, between 1851 and 1876. A law for recovering the mountains with wood, which has been prepared by M. Forcade de Rouguet, director-general of the administration of the forests, was adopted by the legislative bodies in 1860, and was put in operation shortly afterward.—M. J. Cleve, *in Popular Science Monthly* for October, 1881.

To Detect Oil Pennyroyal in Oil Peppermint.—Messrs. J. J. Quetting & Co., having found much oil of peppermint in the market adulterated with oil of pennyroyal, they have sent postal cards to their customers warning them of the fact and giving the following test, which they indorse as reliable:

Take one dram chloral hydrate, and a half dram C. P. sulph. acid; mix together in a glass mortar, add a few drops of alcohol, and stir until it becomes clear. Then use this mixture in equal proportions with the suspected oil in a small porcelain dish, and mix thoroughly together. The result is a fine cherry color if the oil is pure; otherwise if adulterated with pennyroyal, it turns a dark olive green, more or less as to quantity of adulteration.—*Oil and Drug News.*

Uses of Chaulmoogra Oil in Skin Diseases.—A foreign exchange says, Chaulmoogra oil, which has obtained a certain reputation in India for the amelioration of the symptoms—I will not say the cure—of leprosy, has been introduced into this country with the somewhat vague reputation of being useful in skin diseases. It has answered well in some cases of eczema of the face which had passed the moist stage and tended to become dry. It seems to act as a mildly stimulating astringent, but its applicability is certainly limited, and experiments with it in Germany, recently reported, have not increased its reputation. It is in the strumous forms of eczema of the face in children and young persons that the best results from its use have been attained.—*Med. and Surg. Reporter*, Nov. 26, 1881.

Precipitated Sulphur for Pimples on the Face.—Dr. Gage Parsons ("London Practitioner") says that the usual lotion of the flowers of sulphur with glycerin and water is undoubtedly a valuable remedy, but

from the readiness with which the sulphur separates it is inelegant and inconvenient, while it is not quite satisfactory in its results. A far more efficacious mode of using sulphur is to dust the face with pure precipitated sulphur every night with an ordinary puff used for toilet purposes. Recently two severe cases of acne of two years' standing which had resisted the ordinary methods of treatment, yielded at once to sulphur thus applied. If the sulphur be scented with oil of lemon or roses it will form an elegant cosmetic.—*Louisv. Med. News*, Nov. 12.

LOTION FOR FRECKLES.—

℞	Hydrarg. bichlor.,	gr. vi	
	Acid. muriat. dil.,	f℥i	
	Aquæ,	f℥iv	
	Alcoholis,		
	Aquæ rosæ,	*aa* f℥ii	
	Glycerinæ,	f℥i	M.

Apply at night, and wash off with soap in the morning.—*Cinc. Lancet and Clinic*, Nov. 26, 1881.

CHROMIC ACID FOR THE REMOVAL OF WARTS.—Dr. W. Allen Jamieson says in "Practitioner" for September, 1881, that chromic acid, one to one of water, is by far the best remedy. The skin round each wart is first protected by painting it with oil, and then the wart itself is soaked with the solution of chromic acid; this absorbs water from the tissues, coagulating and hardening the albuminous tissues at the same time, and the unsightly warts soon disappear. These warts seldom appear after puberty on the hands, but a healthy girl, well grown, aged fifteen, came to the writer some time since with dozens of them on her hands, which had annoyed her for six years. Of course they much interfered with work, being always in the way. Steady use of the chromic acid removed them in a few weeks.[1]—*Med. and Surg. Reporter*, Nov. 26, 1881.

CHLORIDE OF ZINC AS A TEST FOR ALKALOIDS.—Starting from the idea that the color reactions in alkaloids are caused by subtraction of water from the reagents used, Signor Czumpelitz recently devised a method of distinguishing alkaloids, and successfully used chloride of zinc for the purpose. The substance to be examined is perfectly dried and then moistened with two or three drops of chloride of zinc solution (one gram of chloride of zinc, 30 cc. of hydrochloric acid, and 30cc. of distilled water); then the substance is dried anew in a water-bath. In this way strychnine is colored vermilion, thebaine yellow, narceine olive green, delphine brown red, berberine yellow, veratrine red, quinine pale yellow, digitaline chestnut brown, salicine violet red, santonine violet blue, cubebine carmine red.

COCA A CURE FOR MORPHINISM.—"La Independencia Medico" quotes the following case: A lady had been in the habit of alleviating her suffer-

[1] Twelve years ago we have used chromic acid for the removal of warts with one or two applications. The top of the wart was moistened with water, a small quantity of the crystallized acid was applied and allowed to dissolve and to dry again, care being taken to prevent its spreading over the skin. No pain was experienced and a second application was rarely necessary.—EDITOR. AM. JOUR. PHAR.

ings with morphine, of which drug she finally took sixteen grains a day. Thirty hours after having taken her last dose she was found in a condition of great anguish, excitation, and inquietude. During the night chloral hydrate and iodide of potassium were given to allay the excitation and produce sleep. The next day she was very weak and restless, hardly able to speak, and tormented with vomiting; the pulse was 150. The fluid extract of coca was administered in doses of a tablespoonful. The first dose had but little effect. The second was followed by a wonderful change; the pulse fell to 85, the countenance assumed color and animation, and the vomiting ceased. The patient began to speak, and was in excellent spirits. She slept almost half of the following night, awoke refreshed, with a pulse of 75, took breakfast, and digested it well. She continued to improve, rode in a carriage for quite a distance, and left the city next day, taking with her an eight-ounce bottle of coca, which remedy she continued to take in diminishing doses. When she ceased taking it she was enjoying good health, without the use of morphine.—*Med. Record; Louis., Med. News*, Nov. 19, 1881.

QUININE FOR PREVENTION OF SUNSTROKE.—Though somewhat out of season, we think it worth while to enter for preservation the means of prevention of sunstroke recommended by an English surgeon. He says:

For seven years of residence in Central China, upon the banks of the Yang-tze-kiang, which annually overflows its banks, I found nothing so protective against sunstroke as ten grains of sulphate of quinine suspended in a wineglassful of sherry, and taken before going out at midday, when required to brave the sun-heat, which is oftener above than below Calcutta temperature. I have tried this plan in so many cases that I feel certain that quinine is as prophylactic against sunstroke as against malarial fever. It was while endeavoring to neutralize the miasma which causes the latter that I noticed how completely I felt braced against the effects of the sun-heat. I should be inclined to dissolve the quinine in hydrobromic acid instead of the sherry.—*Med. and Surg. Reporter*, Oct. 22, 1881.

PILOCARPINE AND MUSCARINE.—Dr. S. Ringer has made the curious observation that the antagonism of pilocarpine and extract of muscaria on the frog's heart varies in different months. In the summer months pilocarpine always strongly antagonizes extract of muscaria, but in the winter months there is often no antagonism, and even when it occurs, it is generally slight. This difference is due to temperature.—*Med. and Surg. Rep.*, Nov. 19, 1881.

THE TEA-PLANT.—The vegetation on the southern slopes of the eastern Himalayas, three or four thousand feet above the sea, though by no means luxuriant, is said to be very agreeable and of much interest to the botanist. Among the plants native to these slopes, planted in the course of nature during the preparation of the earth for man, and left wild with the elephant and the leopard, is a shrub growing from twenty to thirty feet high, and well worthy to be selected for pleasant foliage and fine flowers. The lanceolate leaves are from two to six inches long, and the flowers are large

and white, very fragrant, in clusters of two or three in the axils of the leaves. This is the tea-plant, of the genus *Thea*, very nearly allied to the genus *Camellia*, of which the *Japonica* and other species from China and Japan are favorite cultivations of the greenhouse in Europe and this country. Nowhere in the world but on the borders of the Himalayas and in the wild regions of Assam is the tea-plant found growing uncultivated, but it was not discovered in this its natural habitation until the present century. As a cultivated plant, the Chinese have certainly had it since the fourth century, and they claim it to be indigenous to their own soil—just as confidently as they claim the parentage of numerous valuable articles. China has given tea to the world, and has furnished a favorable home to the plant, which is nevertheless quite as well suited in its native land, farther east. When it became known in England that the tea-plant grew native in the highlands of the Himalayas, English companies engaged extensively in the cultivation of tea in that region, and finally, after the correction of notable failures in methods of culture and of cure, it appears that the finest teas of Asia are those of these mountain plains and the choicest plants are of variety *Assamica*, lately propagated from the wild shrub of the mountains.—*From "The Chemistry of Coffee and Tea,"* by Professor Albert P. Prescott, *in Popular Science Monthly for January.*

THE ADMINISTRATION OF IRON.—The tendency on the part both of prescribers and large drug manufacturers is to combine iron with other tonics, in the form of elixirs, syrups and wines of iron and quinine, iron and strychnine, strychnine and pepsin, and so on *ad infinitum.* The combinations with pepsin are a shameful waste of this valuable remedy, and well calculated to bring it into disrepute. None of the others above mentioned should be used for or in any gastric derangement, except with due regard to time of administration. The most suitable time to give iron is one hour before meals, or four hours afterward.—*A. W. Perry, M.D., in Western Lancet.*

CAMPHORATED CHLORAL HYDRATE.—M. Simons having observed a case of poisoning by a mixture of equal parts camphor and hydrate chloral, conceived the idea of employing the same preparation in therapeutic doses. Twenty drops of this mixture in a draught cut short an attack of acute mania. M. Simons believes that it could be employed with good results in hydrophobia, tetanus and delirium tremens.—*Med. Press and Circ.; New York Medical Abstract.*

CHLORO-CARBOLATED COTTON FOR TOOTHACHE.—J. B. Garrison advises the following for cases of toothache, due to exposure of a nerve, and has found it serviceable in many cases of dental neuralgia: Chloral hydrate and carbolic acid are combined in equal proportions, making a liquid, in which is placed a sufficient quantity of the cotton of the populus canadensis, or cotton-wood tree, and allowed to remain a day or two. It is then pressed out so as to remove the superfluous fluid, and it is ready for use. The cavity of the aching tooth is thoroughly dried, and then filled with this chloro-carbolated cotton and covered with wax or some other material

impervious to water. The cotton from the cotton-wood tree is much better, he says, than ordinary cotton, on account of its being firmer and shorter, and so more easily subdivided and made into pellets to be introduced into small cavities. It can be easily procured in the month of June in any of our river bottoms.— *Western Med. Reporter ; St. Louis Courier of Medicine*, Nov. 8, 1881.

Oil of Juniper Antiseptic Catgut.—Dr. Kocher, of Berne ("Deutsche Medicinische Zeitung"), claims that oil of juniper has very permanent effects as an antisceptic, and employs the following method of preparing catgut with it: The required quantity of catgut is placed for twenty-four hours in pure oil of juniper, and immediately subsequent to this is transferred, tightly wound on a flat reel ten inches long, to ninety-five per cent. alcohol. If placed in glycerin for a day prior to immersion in alcohol it becomes more pliable. When desired the catgut must be cut exactly where the edges of the reel turn.—*Chicago Med. Review.*

Solvent for Gallic Acid.—Mr. Frederick Long writes to the "British Medical Journal" to say that he has accidentally discovered a method of dissolving gallic acid. Having a short time since a case of hæmaturia, the result of uric-acid gravel, he chanced to prescribe a mixture containing half a drachm of gallic acid and a drachm and a half of citrate of potassium, and, to his surprise, he found he had a perfectly clear liquid, the gallic acid being completely dissolved. He has since made further experiments, and he finds that, with care, twenty grains of citrate will dissolve as much as fifteen grains of gallic acid in an ounce of water, and remain quite clear for any length of time. To be able to give gallic acid in perfect solution is a great advantage, as absorption must take place more rapidly when the salt is in solution than when simply suspended in mucilage. The citrate, being a very simple salt, can do no harm in any cases in which gallic acid is required. The only means of dissolving gallic acid for medicinal use heretofore known to Mr. Long have been alcohol and boiling water, both of which are practically useless.—*Phil. Med. Times*, Nov. 19.

Boracic Acid Poisoning.—The prevailing opinion is favorable to the use of boracic acid in catarrhal affections of mucous membranes. Nobody apprehends poisonous effects from this remedy. Mododewkow, of Moscow, relates two cases of fatal poisoning that are well calculated to disturb the assurance of safety in the use of boracic acid. A patient with a pleuritic exudation was tapped, and the cavity subsequently washed out by injections with a five per cent. solution of the acid, a part of which was allowed to remain in the pleural cavity. A similar operatiou was performed upon a lumbar abscess. Both patients soon complained of nausea, followed by incessant vomiting and hiccup. An erythema appeared in their face, whence it rapidly extended over the trunk and extremities. The temperature was but passingly increased and sunk to 36°C. The pulse became filiform, and cardiac paralysis supervened with symptoms of utter exhaustion. The autopsy of the second patient exhibited punctated ecchymoses upon the anterior wall of the right ventricle, otherwise nothing remarka-

ble. Morphine exercised no control over the emesis. The mind of the patients was at no time clouded.—*Louisville Med. News*, Nov. 19, 1881.

IODOFORM INTOXICATION.—A. Henry ("Centralblatt für Chirurgie," October, 1881), mentions two cases of intoxication with iodoform, both of which terminated fatally, with coma, aphonia, paralysis of sphincters, retracted abdomen and accelerated pulse. In one case more than 100 grams of iodoform had been administered. The threatening symptoms appeared on the second day, and death occurred on the sixth. In the second case the symptoms appeared on the ninth day, and death ensued on the sixteenth.—*Chicago Med. Review*, Nov. 20, 1881.

ARNICA IN FURUNCULOSIS.—Dr. Planat ("Revue de Thérapeutique Médico-Chirurgicale") claims very good results from the use of arnica paste in the treatment of furuncles of a purely inflammatory character. Arnica, according to him, aborts furuncles with great promptitude, probably by reason of its action on the vaso-constrictor nerves of the superficial vessels of the skin. The inunctions are made with the following mixture: Extract of fresh flowers of arnica, two drachms and a half; honey, five drachms. If this mixture prove to be too liquid, a small quantity of lycopodium should be added to it, to render it sufficiently adhesive. This paste is spread in moderate thickness on waxed linen or on diachylon plaster and applied to the furuncle. The dressing should be renewed every twenty-four hours. Two or three applications generally suffice to abort furuncles. Occasionally, when due to diathetic conditions, internal treatment will be rendered somewhat necessary.—*Chicago Med. Review,* Nov. 5, 1881.

THE DISADVANTAGES OF COD-LIVER OIL FOR YOUNG CHILDREN.—According to the "Revue Médicale," the Council of Public Health has recently submitted for the sanction of the Academy of Medicine of Paris a report on the disadvantages of cod-liver oil administered to infants and young children. The commission on the hygiene of infancy has not yet reported its opinion on this subject; but the accusations brought against this medicine by the Council of Hygiene are worth notice. All physicians are aware what disastrous influence is exercised on the health of young infants by defective alimentation, and especially animal nourishment; fatty matters are as little suited to the alimentation of newly-born infants as albuminoids, excepting always casein, which exists normally in milk, and is found to be perfectly assimilable. In fact, in the first period of life, the juices necessary for emulsifying fatty matters are almost entirely wanting. The liver, in spite of its enormous development in this stage of existence, secretes only a small quantity of bile; and the researches of Langendorf and Zweifel have proved that, in young children, pancreatic juices possess an emulsive power which is almost *nil*, or, at least, very slightly marked. These physiological considerations sufficiently indicate that—far from being profitable to the infant—fatty matters, and especially cod-liver oil, can only injure its health, and gravely compromise the integrity of its digestive functions.—*British Medical Journal; Cinc. Lancet and Clinic*, Nov. 26.

THERAPEUTICAL NOTES.—*Peruvian Balsam in Laryngeal Ulcerations.* —In this disease Dr. M. Schmidt recommends specially antiseptic inhalations of Peruvian balsam. Ten drops of a mixture consisting of two parts of Peruvian balsam to one of spirit of wine, are added to boiling water, and the vapor which rises is inhaled for some time; this is done three or four times a-day.

Parsley as an Antigalactic.—Dr. Martin, in the "Bull. gen. de Therapeut.," states that if the breasts of a nursing woman be covered with parsley leaves freshly pulled, the application being renewed several times a day, as quickly as the leaves fade, the milk will soon cease to appear. This is an application which may be used when it is impossible to give purgatives or other remedies internally.

Pliable Iodoform.—Dr. Fowler makes a pliable mass of iodoform by mixing it with isinglass and glycerin. The isinglass is reduced to a jelly by steam, and enough glycerin added to give it consistency and pliability. The proportions are as follows: Iodoform, ℥i; isinglass, ℥viii; glycerin, ʒvi.

Pills for Incontinence of Urine.—Professor Gross advises:

℞	Strychniæ, ...	gr. i	
	Pulv. cantharid., ...	gr. ii	
	Morph. sulph., ...	gr. iss	
	Pulv. ferri, ...	℈ i	M.

Make 40 pills.

Dose: One three times a day to a child ten years old.—*Med. and Surg. Reporter*, Oct. 22, 1881.

METAPHOSPHORIC ACID is recommended by Hindenlang, in "Berlin Klin. Wochenschrift," as a safe and efficient reagent for albumen. Immediately before use dissolve a small piece in water, and add this to the urine to be examined. A cloudy solution appears when only the slightest traces of albumen are present.—*Atlanta Med. Register.*

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, Jan. 17th, 1882.

In the absence of the President Mr. T. Morris Perot was called to the chair. The minutes of the last meeting were read and approved.

The report of the Proceedings of the Fifth International Pharmaceutical Congress held in London in 1881 was presented by the general secretary, Mr. Bremridge, by direction of the Council. A copy of the "Chemist's and Druggist's Diary" for 1882 was also presented by the publishers.

A very handsome pine cone brought from Alaska by Dr. Joseph Thomas, measuring seventeen inches in length and five and one-quarter inches in diameter was presented by Mr. C. H. Needles. On motion, the thanks of the College were directed to be returned to the donor.

Prof. Maisch read a paper upon the *Oil of the Betula lenta*, cherry, sweet or black birch bark, by Mr. George W. Kennedy, of Pottsville, Pa. (see

page 49 of this number). Samples of the branches used in extracting the oil, and of the oil itself, were exhibited. Professor Sadtler suggested that the oil deserved to be investigated for the possible presence of an aldehyde.

A paper upon *Wine of White Ash Bark* was also read by Prof. Maisch (see page 54 of this number). Both papers were referred to the Committee on Publication.

After some discussion on various subjects the meeting adjourned.

T. S. WIEGAND, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

ALUMNI ASSOCIATION, PHILADELPHIA COLLEGE OF PHARMACY.—At the third social meeting held Dec. 13, Dr. Kirk delivered a lecture on *Anæsthesia and Anæsthetics*, dwelling more especially upon the chemistry and upon the physiological effects produced by the inhalation of ether, chloroform and nitrous oxide; experiments were also made with the latter, showing the high degree of heat produced by its use for sustaining combustion.

The fourth social meeting was held January 10, when a lecture on *Fermentation* was given by Dr. Tobolt, with especial reference to vinous fermentation and the various alcoholic liquids.

A very pleasant reunion took place at the College on the evening of December 30, when the students, a number of graduates and friends of the College were present, including many ladies. Addresses were made by Drs. Miller, Turnbull, Richardson, and Mr. Trimble. The audience was also entertained with recitations, inspected the various improvements recently made in the College and partook of a sumptuous collation in the museum.

THE TRADE ASSOCIATION OF PHILADELPHIA DRUGGISTS tendered a reception to their friends at the College of Pharmacy on the evening of December 28. An exhibition with the oxy-hydrogen lantern was given by Prof. Maisch, and after partaking of the repast provided addresses were made by Messrs. W. B. Thompson, W. L. Turner, Dr. L. Wolff, C. Needles, L. Sayre and others. A very interesting exhibition of microscopes and microscopical specimens was made under the supervision of Mr. Holman, of the Franklin Institute.

PHILADELPHIA DRUG EXCHANGE.—The annual meeting was held January 17 at the rooms of the Exchange, No. 17 South Third street, President H. N. Rittenhouse in the chair. Alexander H. Jones submitted the report of the Board of Directors, specially mentioning the Internal Revenue tax, which the Board claimed should be revised, and upon matches, patent and proprietary medicines the tax should be abolished. The Board also favors such a gradual reduction upon all articles that eventually the tax would be wiped out; a revision of the tariff laws, and urges the appoint-

ment of a commission of competent gentlemen, who shall give the subject their patient consideration, calling to their aid those best informed upon all matters affecting trade and manufactures. The report was, on motion, referred to the in-coming Board.

Mr. Dallam submitted a resolution to the effect that the Exchange, through its Board of Directors, institute prosecutions against all thieving employés in the trade, which was adopted.

The election for officers and directors resulted as follows: President, W. J. Jenks; Vice President, C. B. Linn; Secretary, A. R. McIlwaine; Treasurer, E. H. Hance. Directors—William Gulager, A. J. Jones, Dr. Richard V. Mattison, W. M. Wilson, Robert Shoemaker, H. N. Rittenhouse, H. B. Rosengarten and M. N. Kline.

New York German Apothecaries Association.—At the annual meeting the following officers were elected for the year: President, P. Fred. Lehlbach; First Vice President, C. Schleussner; Second Vice President, A. Tscheppe; Recording Secretary, J. B. v. Fuerstenwaerther; Corresponding Secretary, C. Eimer; Treasurer, Theo. Louis; Archivist, A. Tscheppe; Librarian, Paul Balluff; Trustees—G. Hebberling, Fr. Burghoff, G. Pfingsten.

The association numbers 114 members.

Massachusetts College of Pharmacy.—At the Pharmaceutical meeting held December 13, the subject of *Pharmacopœia Revision* was discussed and the zealous labor of the Chairman of the Committee on Revision, Dr. Charles Rice, of New York, commented upon. The omission of all doses from the pharmacopœia, as directed by the National Convention, was discussed in its various aspects, and in connection with this, the responsibility of pharmacists in regard to doses prescribed, and the propriety of adoption, by physicians, of a uniform sign for indicating the correctness of an unusual dose, that may be prescribed.

Cincinnati College of Pharmacy.—At the annual meeting held January 10th, the following officers were elected: President, James H. Feemster; Recording Secretary, Wm. J. Martin; Corresponding Secretary, F. Schuerman; Treasurer, Chas. Faust; Trustees—George Eger, Dr. R. M. Byrnes, H. Wrede, M. Gleick, and F. A. Kautz, the latter to serve the unexpired term of Jas. H. Feemster.

The Virginia State Pharmaceutical Association was organized at Petersburg, January 4th. The Pharmaceutical Association of that city had issued a call, in response to which a number of pharmacists from different parts of the State assembled and effected a temporary organization by the election of W. F. Spotswood, of Petersburg, chairman, and E. R. Beckwith, of the same city, secretary. After the permanent organization had been agreed upon, the following officers were chosen: President, T. Roberts Baker, Richmond; Vice Presidents—C. A. Santos, Norfolk, Wm. E. French, Petersburg, C. H. Lumsden, Lynchburg, and G. W. May,

Staunton; Secretary, E. R. Beckwith, Petersburg; Treasurer, F. H. Masi, Norfolk; Corresponding Secretary, Dr. E. A. Craighill, Lynchburg.

A constitution and by-laws were adopted and a committee was appointed to draft and report a pharmacy law to be presented to the General Assembly for its action. The committee consisting of J. W. Thomas, Norfolk; T. F. Knock, Petersburg; C. H. Lumsden, Lynchburg; G. W. May, Staunton, and F. H. Masi, Norfolk, subsequently reported the law, which was approved and adopted as a whole.

On motion of Dr. Starke, it was resolved that all reputable druggists in the State shall be eligible to membership in the Association on sending their names to E. R. Beckwith, Secretary, Petersburg, Va., and complying with the following by-laws: "The initiation fee of this Association shall be $1, with the annual contribution for the current year, shall be paid into the treasury; and the applicant sign the constitution and by-laws before the close of the next annual meeting to be held on the third Tuesday in May next, in Richmond."

During the sessions of the convention the visiting pharmacists were very hospitably entertained at a banquet by the Petersburg Pharmaceutical Association in the banquet-room of the Masonic Hall.

West Virginia Pharmaceutical Association.—A special meeting was held, January 12th, in McLain's Hall, in the city of Wheeling, for the purpose of considering the proper steps to be taken in relation to a bill before the Legislature which, in section 3, provides for the appointment, by the circuit court in every county, of a board of examiners—consisting of three intelligent physicians—for the purpose of examining all persons desiring to obtain a license to carry on the business of a druggist in such county. The section also forbids the sale of alcohol, except upon the affidavit of the person requiring it, stating the quantity and the "mechanical or scientific" purpose for which it is to be used; it also forbids the sale of spirituous, vinous and malt liquors, drinks, mixtures or preparations, except upon the written prescription and statement of a practising physician "of good character and standing in his profession," certifying on his professional honor that the article is absolutely necessary as a medicine.

The Association, after a lengthy discussion, expressed itself strongly in opposition to the bill as far as it relates to druggists, and in favor of maintaining the present pharmacy act with such amendments as had been proposed by the Commissioners and in the Governor's message. A special committee was appointed to use all honorable means to defeat the bill.

The committee had a protracted hearing before the Judiciary Committee on January 21st, when Mr. Logan spoke of the iniquities of the proposed law, and Mr. Bocking of the benefits of the present act. The Judiciary Committee finally agreed to strike out section 3 of the proposed bill, which, as amended, relates mainly to licenses for the sale of intoxicating liquors and is, in the main, considered unobjectionable.

Pharmaceutical Society of Great Britain.—At the Pharmaceutical Meeting held November 2d, three papers were read which we pub-

lished in our last number, pages 18 to 23. Mr. Martindale's incompatible mixture (see page 18) and the manner in which he overcame the difficulty and succeeded in dispensing the mixture so that it could be given in properly divided doses, occasioned considerable discussion concerning that apparently inexhaustible question whether and to what extent the dispenser was justified in deviating from the letter of the prescription. While several members expressed themselves as being averse to deviating in any manner without previously consulting the physician, and if that were impossible to rather decline compounding the prescription or to dispense it with a "shake-the-bottle" label, others were of the opinion that the dispenser was bound to assume personal responsibility so that a fair and proper dose of the ingredients ordered could be given, and that the prescriber should be informed of the deviation, if possible, before, or if not afterwards.

In the discussion on Mr. Gerrard's paper (see page 20), it was stated that while the change in odor might be explained, the cause of the alteration in color was as yet unknown. Mr. Parker's paper (page 21) brought prominently forward some of the difficulties in ascertaining the solubility of any material.

EDITORIAL DEPARTMENT.

ITERNATIONAL PHARMACOPŒIA.—The commission inaugurated at the International Pharmaceutical Congress of London, for the elaboration of an international pharmacopœia, has been completed for the United States, the Council of the American Pharmaceutical Association having elected to this position Charles Rice, Ph.D., of New York, the efficient chairman of the committee on revision of the U. S. Pharmacopœia.

SECRET MEDICINES.—It will be remembered by many readers of the JOURNAL, that, five or six years ago, a Popular Health Almanac was issued, the object being the imparting of useful information on all subjects connected with the health of the individual and the public, and more particularly on the composition of nostrums. This enterprise did not meet with the encouragement which it deserved. We were reminded of this on reading in the "Pharmaceutische Zeitung" for Sept. 21st, of a plan put into execution by a German pharmacist, L. Hausmann, who has procured a number of copies of an official report on secret medicines, published by C. Schnetzler and Dr. F. Neumann, for the purpose of lending them gratuitously to such of his customers who feel an interest in this subject. The German literature contains several works, giving the composition of popular nostrums as ascertained by chemical analysis. Whether the publication of these works has exerted any marked influence on the popular use of the compounds we are not prepared to say; but, doubtless, a knowledge of the composition of the latter would be of more practical use to the public than their indiscriminate employment upon the strength of the manufacturers' recommendations; and if the public will not purchase the books, it

would seem to be a commendable act to let them have the information free of expense.

FOREST CONVENTION.—We have on various occasions referred to the necessity of forest culture; that druggists and pharmacists are, in a large measure, interested in this question, was well shown in the interesting and instructive address of Mr. G. W. Sloan, delivered by him as president of the American Pharmaceutical Association at the meeting held at Saratoga in 1880, and in which he proved the gradual disappearance of many medicinal plants from localities where they had formerly been plentiful, but had now ceased to grow in consequence of the destruction of forests. His suggestion that the State Pharmaceutical Associations confer with State Boards of Agriculture with the view of the more systematic cultivation of medicinal and other useful plants, has, we believe, not secured that notice and attention which it seems to deserve.

The country at large is doubtless to a still greater extent interested in the constantly increasing demand for timber of nearly every description, but more especially for those kinds which are largely used in building and for general manufacturing purposes. This demand has been followed by scarcity of timber in many localities and by a large appreciation in value of lumber, so that the necessity becomes yearly more obvious of making provision for the future supply of material in which all industries are interested, either directly or indirectly. The call for a forest convention does therefore appear to come not any too soon. The convention is to assemble in Cincinnati on April 17th next, and we understand that extensive arrangements are being made to insure the success of the great object in view—the rational cultivation of forests. It will require much patient labor to educate the popular mind in looking upon forests from other points of view than that merely relating to the income to be derived from the cutting of timber; but it is a labor in which all should feel interested, and druggists and pharmacists to at least as great an extent as the general public. The city inaugurating this movement is deserving of high praise for the commendable spirit shown in the endeavor of enlisting the active co-operation of all sections of the country, with the view of securing the adoption of measures that are of national importance.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Report of the Proceedings of the Fifth International Pharmaceutical Congress, London, 1881. London: Pharmaceutical Society of Great Britain, 1881. 4to, pp. 299.

This handsome volume gives in the Preface a brief history of the origin of the fifth international pharmaceutical Congress, of whose proceedings a full account has been published in our October number, 1881, pp. 513—528. This official report contains the discussions in full, each speech being given in the language used by the speaker, and where this was not English an English translation is supplied; and all communications placed before

the Congress are printed in the English, German and French languages, such printed versions having also been supplied to the members of the Congress.

Die Pflanzenstoffe in chemischer, physiologischer, pharmakologischer und toxikologischer Hinsicht. Für Aerzte, Apotheker, Chemiker und Pharmakologen bearbeitet von Dr. A. Husemann, Dr A. Hilger und Dr. Th. Husemann. Zweite völlig umgearbeitete Auflage. Berlin: Julius Springer, 1882. 2. Lieferung. Price, 6 marks.

The vegetable compounds in their chemical, physiological, pharmacological and toxicological relations.

We have noticed the first part of this valuable work on page 638 of our last volume. The part now before us completes the first volume, which makes a book of 664 pages, and embraces the remainder of the cryptogams and of the phænogamous plants, the gymnosperms, the monocotyledons and a portion of the dicotyledons, namely Amentaceæ, Urticineæ, Centrospermæ and Polycarpieæ, the latter including the following natural orders: Lauraceæ, Berberidaceæ, Menispermaceæ, Myristicaceæ, Anonaceæ, Magnoliaceæ, Monimiaceæ and Ranunculaceæ. Among these plants quite a number are found possessing considerable importance on account of their chemical constituents as well as their uses in medicine and the arts, such as the pines and firs, aloes, colchicum, veratrum, sabadilla, the oaks, peppers, rhubarb, the laurels, aconites and others. Many of these have been subjected to chemical investigation, often with conflicting results, which the authors have endeavored to harmonize where possible. In quoting the literature, the journals on works in which the investigations were originally published, are usually given, though in some cases the translations or abstracts are only referred to. The more recent American literature has received its full share of attention; but of older investigations we believe that those on Aspidium marginale, the root of Myrica cerifera, the root of Maclura aurantiaca, the herb of Polygonum hydropiper, the oil of Chenopodium anthelminticum, the products of Benzoin odoriferum, the barks and fruit of different magnolias, the herb of Anemone Ludoviciana and others deserved to be briefly noticed. No mention is made of Drimys Winteri. Borneol or Borneo-camphor has been placed under Lauraceæ, following camphor, with which it is chemically related, although according to the general plan of the work it would be looked for under Dipterocarpaceæ. But these imperfections, including also the few cases where the old notation has not been changed, as on page 568, are of little importance. In all important matters the information given is full and in keeping with the latest researches, and when, as might be expected, subjects of less or of trifling weight and value are mentioned, they have generally received as fair an attention as on critical examination they seem to require. The work, as far as it has appeared, is of that high character which insures its due appreciation by those who have occasion to consult it, and by the selection of clear and distinct types, and of good paper, the publishers present it in an attractive garb.

Illustrations of dissections in a series of original colored plates representing the dissections of the human body. By Geo. Viner Ellis, Professor of Anatomy in University College, London, and G. H. Ford, Esq. Vol. I. Second edition. New York: Wm. Wood & Co., 1882. 8vo, pp. 233.

The first issue of the present year's series of Wood's Library of Standard Medical Authors is a volume containing 28 plates of dissections which were originally executed of life size and published in folio, but have been reduced on a uniform scale and reproduced in facsimile expressly for this edition. The volume illustrates the dissections of the upper limb, the head and neck, and the figures have been drawn from actual dissections, and printed in colors with the object of making them as true pictures as possible of nature, and more serviceable as copies for the student to imitate. The part of the human body to be illustrated is divided into suitable stages or regions, and the muscles, blood vessels and nerves of each region are shown in layers in the natural order of succession, so that their mutual connections may be brought before the eye at one and the same time. The plates are handsomely executed and the accompanying text has been written with the view of its practical usefulness to the anatomist and surgeon.

Proceedings of the North Carolina Pharmaceutical Association at its second annual meeting held at Newbern, August 9 *and* 10, 1881. Monroe, N. C.: 1881. 8vo, pp. 64.

The officers for the current year are S. J. Hinsdale, Fayetteville, president; Wm. Simpson, Raleigh, E. H. Meadows, Newbern, and V. A. Thompson, Winston, Vice-presidents; T. C. Smith, Charlotte, Secretary; S. H. Smith, Winston, Local Secretary, and J. S. Pescud, Raleigh, Treasurer.

Papers were read by S. J. Hinsdale on various tests; by E. V. Zoeller on the metric system; by J. A. Sheets, on syrup of ferrous iodide, and by E. V. Zoeller on syrups and emulsions. The next annual meeting will be held at Winston, on the second Wednesday of August, 1882.

Proceedings of the second annual meeting of the Illinois Pharmaceutical Association, held at Peoria, Oct. 18 and 19, 1881. Chicago: 1882. 8vo, pp. 63.

An account of this meeting will be found on page 586 of our last volume. The pamphlet contains the portrait of Mr. W. W. Marmon, the first president of the association.

An apparatus for the rapid analysis of mixtures of gases. By Arthur H. Elliott, New York.

Reprinted from the School of Mines Quarterly, November, 1881.

Report of the Bureau of General Sanitary Science, Climatology and Hygiene, to the American Institute of Homœopathy. Session of 1881. Pittsburgh. 8vo, pp. 117.

Reprint from the transactions.

THE AMERICAN
JOURNAL OF PHARMACY.

MARCH, 1882.

ON THE SOLUBILITY OF SULPHATE OF MORPHINE.

By Prof. Frederick B. Power, Ph.D.

Read at the Pharmaceutical Meeting, February 21, 1882.

My attention was recently directed, through the reports of the Committee on Descriptive Chemistry of the Pharmacopœia, to the subject of the solubility of sulphate of morphine in water. As all the chemical text-books, and other works which I was able to consult, state that sulphate of morphine is soluble in 2 parts of cold water (Choulant, in Gmelin's "Handbook of Chemistry," vol. xvi, p. 430, Husemann's "Pflanzenstoffe," p. 121, Storer's "Dictionary of Chemical Solubilities," p. 616,[1] etc.), I was surprised to find it stated in the above-mentioned report that the salt requires 15 parts of water at 15°C. (59°F.) for solution. Upon inquiry of my friend, Dr. Charles Rice, I was kindly informed that the commonly accepted factor of solubility is incorrect, and that from recent experiments 15 parts of water are indeed required. That the true degree of solubility of a salt so important, and so frequently employed, should be correctly established would seem very desirable, particularly in view of so considerable a discrepancy.

In Storer's Dictionary, *loc. cit.*, it is stated on the authority of Mohr, Redwood and Procter, in connection with the solubility of the salt, that the cold solution contains 33·33 per cent. of it, which would thus further indicate that in dissolving one part of the salt in 2 parts of water, 3 parts of solution are obtained, or an increase of 50 per cent., presumably by volume.

I have made a few experiments on the subject, which may be of sufficient interest to receive a brief notice.

The sulphate of morphine employed for the determinations was that

[1] Abstracted from "Mohr, Redwood and Procter's Practical Pharmacy," and "Oest. Zeitschrift für Pharm.," 8, p. 201, also, "Canstatt's Jahresbericht für 1854," p. 76.

of Rosengarten & Sons, of this city; it was in the well-known form of light, feathery crystals, and was taken from an original package, recently opened.

Experiment I.—A solution was prepared by digesting sulphate of morphine, in excess, with distilled water at 15°C. (59°F.) for several days, with frequent agitation.

Experiment II.—A concentrated hot solution of the morphine salt in water was allowed to cool to the temperature of 15°C., in order to ascertain whether under these circumstances a supersaturated solution would be formed, which, however, from the analytical results, appears to be not the case.

From the two solutions, as above prepared, and filtered from the excess of the salt, with the proper regulation of temperature, the amounts of sulphate of morphine contained therein was determined by the application of the method suggested a few years ago by Victor Meyer, by precipitating with chloride of barium, and, from the amount of ignited sulphate of barium, inversely calculating the amount of crystallized sulphate of morphine, $(C_{17}H_{19}NO_3)_2.H_2SO_4+5H_2O$.

I. 10·9040 grams of the cold saturated solution gave 0·1396 gram of sulphate of barium, corresponding to 0·4545 gram of crystallized sulphate of morphine, for

$$232·8 : 758 = 0·1396 : x. \quad x = 0·4545.$$

Or expressed in percentage, 4·1682, as

$$10·904 : 0·4545 = 100 : x. \quad x = 4·1682.$$

II. 7·3250 grams of the solution of the salt in hot water, and subsequently allowed to cool to 15°C., gave 0·0946 gram of sulphate of barium, corresponding to 0·3080 gram of crystallized sulphate of morphine, for

$$232·8 : 758 = 0·0946 : x. \quad x = 0·3080.$$

Or expressed in percentage, 4·2047, as

$$7·3250 : 0·3080 = 100 : x. \quad x = 4·2047.$$

The results of these two experiments will be seen to agree very closely, and if, from the percentage strength of the solutions, the amount of water be calculated which is required to dissolve one part of the salt at 15°C., the relation of the two results, disregarding the slight increase of volume produced by solution, will be as follows:

$$\text{I. } \frac{100}{4·1682} = 23·99. \quad \text{II. } \frac{100}{4·2047} = 23·80.$$

Another experiment was made by preparing a saturated solution of

sulphate of morphine at 15°C., filtering into a tared glass capsule, evaporating on the water-bath to dryness, and subsequently heating to 130°C. until the weight remained constant.

8·5880 grams of solution gave 0·3530 gram of anhydrous sulphate of morphine, corresponding to 0·4005 gram of the crystallized salt, or 4·6634 per cent. In this instance the amount of water required for the solution of one part of the salt will be, therefore, approximately, 21·44 parts, or somewhat less than that indicated by the determinations of the previously described method. If, however, the first results be accepted as the more correct, and the method is one which admits of a considerable degree of accuracy, the conclusion must be drawn, that one part of sulphate of morphine requires, in round numbers, 24 parts of water at 15°C. (59°F.) for solution.

It has been recently remarked to the writer, as a result of the practical observations of those who are frequently required to dispense sulphate of morphine, that there is a difference in the degree of solubility of the salt, as produced by the different manufacturers. Whether such a difference really exists, or whether it be simply apparent, I have not had an opportunity of determining, but it is a question of sufficient interest as to merit further comparative determinations.

PRELIMINARY NOTICE OF AN ALKALOID IN THE BARK OF FRAXINUS AMERICANA (WHITE ASH).

BY PROF. FREDERICK B. POWER, PH.D.

In the course of some experiments which were undertaken a few weeks ago by Mr. H. M. Edwards, under my direction, in the chemical laboratory of the Philadelphia College of Pharmacy, our attention was directed to the presence of an alkaloid in the bark under notice. The body in question is apparently quite a strong base, and is, with a considerable degree of probability, the principle upon which the therapeutical virtues of the bark depend; the preparation of the bark which has been most successfully employed for obtaining its specific action being a wine, for which a formula has been given in the last number of this journal by Mr. Thomas S. Wiegand.

The object of this brief notice at this time is primarily to make known the observation, which is attended with special interest from the fact of no alkaloid having as yet been observed in plants of the natural order of oleaceæ, and furthermore, as Mr. Edwards, a stu-

dent of the present class, will not have the opportunity of pursuing the investigation, to request that the further chemical investigation of the subject be reserved for the writer.

The researches herewith connected, embodying the isolation of the alkaloid, its description, composition and properties will be completed and reported upon at the earliest possible date.

HYPOPHOSPHOROUS ACID, $HPH_2O_2=66$.

By Geo. M. Beringer, Ph.G.

Read at the Pharmaceutical Meeting, February 21, 1882.

The demand for syrups of the hypophosphites containing iron, alkaloids, etc., has been so great the last few years that hypophosphorous acid has become an article of considerable importance. It is easily prepared by decomposing the calcium salt with oxalic acid, filtering, washing the precipitated oxalate of calcium and evaporating the solution to the proper consistence. The acid seems to hold in solution a small amount of the calcium oxalate and deposits some of it on standing. The commercial article is always sold as a fifty per cent. solution. Having occasion to prepare some four or five pounds of the acid a short time ago, I was rather surprised at the difference in specific gravity between it and some we had purchased. I have since examined and determined the percentage of several commercial samples. The results are shown in the following table:

		Sp. Gr.						
No. 1—	Own make—	1·228—	132 grs.	neutralized	53 grs.	Na_2CO_3	=50·	per ct.
" 2—	Purchased—	1·155—	"	"	38 "	"	=35·849	"
" 3—	"	—1·134—	"	"	36 "	"	=33·962	"
" 4—	"	—1·160—	"	"	43 "	"	=40·566	"
" 5—	"	—1·124—	"	"	35 "	"	=33·018	"

DETECTION OF MINERAL ACIDS IN VINEGAR.

By J. C. Wharton.

In testing vinegar for *free* mineral acids, there seems to be wanting a ready and simple method of detecting them, as the salts of these acids are regarded as accidental and generally harmless impurities. I would suggest the following, which, though involving well-known reactions, seems to have been overlooked; at least I do not remember to have seen it alluded to by any writer.

The method is to evaporate a portion (about one fluidounce) of the suspected vinegar in a glass or porcelain vessel down to a thick, syrupy extract, just capable of being stirred easily with a glass rod, then let the evaporating dish cool till the hand can bear the heat without feeling unpleasantly warm, or until the dish is about blood-warm, then *stir* into the extract a few grains of finely powdered chlorate of potassium; or if there is no organic extract, or very little, as might result if a very pure article of acetic acid were carefully evaporated, add a small percentage of sugar to the chlorate before mixing it as above directed. If there should be as much as one per cent. of sulphuric acid, the mass would ignite vigorously and I feel confident much less would be indicated by *fire,* and a still smaller quantity, even quite minute, would be made known by the *odor of chlorine.* Muriatic acid would evolve the same odor but produce no fire.

After mixing the chlorate and the extract thoroughly with a glass rod *wait a minute or two,* stirring the mass occasionally, if it does not immediately ignite. Be careful not to place the *face* too near the mixture until several minutes have elapsed, or the ignition may do harm to the eyes. Afterwards the mass may be smelt, to detect the chlorine odor, and if the quantity of mineral acid is minute the dish with its contents may be carefully warmed or even gradually *heated,* smelling occasionally, not too closely, until the dish cools. The extract from pure vinegar does not ignite until the heat is quite painful to the hand if the dish be felt; whereas if sulphuric acid be present the heat will not be very great before the mass burns up with a flare. I am not sure that this test can conveniently be used for the *quantitative* determination of free mineral acid, but think that a method might be devised for conducting the gaseous chlorine into a solution of nitrate of silver, collecting, washing, drying and weighing the precipitated chloride of silver, and, by appropriate calculation, estimating the amount of free acid, having first determined the kind and, if necessary, made a separation of them by available methods which it is not within the scope of this article to detail.

Nitric acid would not be so easily detected, though in skillful hands I think it would appear by manifesting an odor somewhat similar to chlorine (the nitro-muriatic acid odor). But this acid could more advantageously be detected by its action on *copper,* in the form of clean wire or strips, which should be used without the addition of the chlorate of potassium. The above test is very easily made and the chemistry of it is so well understood as to need no further explanation.

Nashville, February 2, 1882.

ON THE ACTIVE CONSTITUENTS OF PODOPHYLLIN.

BY DR. VALERIAN PODWISSOTZKI.

Abstract from the "Pharm. Zeitschrift für Russland," Nos. 44–50, 1881, by Fred. B. Power.

The experiments of the author on the interesting subject of the constituents of podophyllin, which have been extended over a considerable period, having now been concluded, that portion of the investigation bearing more particularly upon the isolation and description of principles of pharmaceutical or chemical importance and interest may be concisely summarized while the pharmacognostical description of the drug or the history of its introduction and application in pharmacy and medicine, to which in connection with numerous physiological experiments the author has devoted a large share of attention, may be considered so well known in this country as to require no further recapitulation.

According to the author the active constituent of podophyllum, and of podophyllin, is a resinous substance, consisting of a resinous acid, which is without action on the animal organism, and an active neutral body, which latter, when freed from the first mentioned acid, can be obtained in a crystalline form. In combination with the acid it dissolves readily in dilute alcohol, but with difficulty in hot water; when freed from the acid, the neutral body crystallizes immediately in the presence of water, dissolves in ether, chloroform, and strong alcohol, and on the addition of hot water to the latter solution crystallizes out immediately. This body possesses exclusively the active properties of podophyllum and podophyllin, so that the above mentioned resinous matter only acts upon the animal organism when it contains this crystalline body; the acid alone is absolutely without action.

The author disproves the previously advanced view of Buchheim that the active constituent of podophyllin is an easily altered anhydride by the fact that the newly discovered crystallizable substance melts at 200 to 210°C., is not decomposed at 200°C., and only begins to blacken at 260 to 275°C. It also bears very energetic treatment with alkalies without decomposition, as is shown by the description of the method for obtaining it. This circumstance complicated the former experiments considerably, as the neutral body, after the separation of the resinous acid, did not dissolve in aqueous liquids but remained suspended in microscopic form, while the acid is rather readily soluble in aqueous liquids. Former investigators avoided the employ-

ment of alkalies in the treatment of podophyllin, as it was observed that it became less active upon the animal organism. It is found, however, that the active principle of podophyllin or podophyllum can only be isolated by the proper use of alkalies, which remove the resinous acid, without forming with the active principle a chemical compound. To the natural compound the author gives the name *podophyllotoxin.* The very active, crystallizable, neutral body which may be separated from the latter, and which represents a definite chemical body is called *picropodophyllin,* while the acid with which the picropodophyllin is combined in the rhizome and in podophyllin to podophyllotoxin, has received the name of *picropodophyllinic acid.*

The independent existence of podophyllotoxin the author considers must be recognized as well as that of colophony and other resinous substances of the vegetable kingdom, according to its analogy with abietinic acid or certain glucosides, which are accompanied by other substances, after the separation of which the original resin ceases to have an independent existence. As an inactive constituent of podophyllin there was further obtained a crystallizable substance in a chemically pure form, which in its properties is related to quercetin, and which is therefore designated as *podophylloquercetin.* This substance also withstands the action of heat to its melting point of 250°C., and to it are due the variations of color of officinal podophyllin.

Of the results of previous investigations it is confirmed that a body insoluble in ether is contained in officinal podophyllin, which is without action on the animal organism, forming a resinous, amorphous, acid mass, and which bears no relation to the active constituent, picropodophyllin. It is also confirmed that podophyllin contains two fatty substances, decomposition products of different extractive matters, inorganic substances obtained from the rhizome in the process of manufacture and such as arise from the employment of alum in precipitation for the purpose of imparting a yellow color to the product.

Picropodophyllin.—Colorless, silk-like, extremely delicate crystals, which upon drying aggregate to felt-like, shining, silky masses. They are very readily soluble in chloroform, and readily soluble in 90 to 95 per cent. alcohol, but difficultly soluble in 85 per cent. alcohol. Picropodophyllin is so slightly soluble in 50 or even 75 or 80 per cent. alcohol that this can be employed for washing the crystals to remove adhering extractive matters and the calcium or barium compounds of the picropodophyllinic acid. Picropodophyllin is also soluble in ether,

and crystallizes from the warm saturated solutions upon cooling; it is completely insoluble in water, oil of turpentine and petroleum benzin, but soluble in hot fatty oils, from which, upon cooling, it gradually crystallizes. Picropodophyllin is likewise soluble in glacial acetic acid, and crystallizes therefrom on spontaneous evaporation in the form of large, cross-like groups of flat prisms. By the addition of water to the alcoholic solution it is immediately precipitated in the form of fine, long, silky needles. The taste of the solutions is extremely bitter, the reaction neutral. Aqueous ammonia does not precipitate alcoholic picropodophyllin solutions, and when such an ammoniacal-alcoholic solution is heated upon the water-bath until the liquid portion has become expelled, the picropodophyllin is converted into a substance of an acid reaction, incapable of crystallizing, and without action on the animal organism. The same result is obtained by heating the alcoholic picropodophyllin solution, and frequently adding portions of ammonia until the last traces of crystallization disappear, which can easily be controlled by means of the microscope. The ammonia must be allowed to act for a very long time, at the highest possible temperature of the water-bath, and the evaporated ammonia must be frequently renewed by fresh additions. A few grains of picropodophyllin required for this transformation from 4 to 6 ounces of concentrated ammonia water. Picropodophyllin dissolves very readily in picropodophyllinic acid; the behavior of these solutions will be described further on. Alcoholic solutions of picropodophyllin produce the same effect when brought into the animal stomach as podophyllin, although much more active. For this purpose only such solutions can be employed from which it does not separate, and consequently hot solutions in dilute alcohol or oil do not come into consideration. 4 centigrams (0·6 grain), when brought into the stomach with the precautions required to prevent its crystallizing out, killed a full-grown cat after frequent vomiting and incessant mucous evacuations, death occurring within from 20 to 24 hours. 6 centigrams (0·9 grain) of officinal podophyllin given to a cat produced simply evacuation of the bowels and vomiting, but the animal did not die, and had completely recovered in a few days. Picropodophyllin is the more violent and rapid in its action the less it crystallizes out from its solutions in the animal organism. On subcutaneous injection it crytallizes in the same spot in which it is injected, and produces absolutely no effect. It is not changed by acids. Its melt-

ing point is from 200 to 210°C.; at 200°C. it is not decomposed but forms a soft crystalline mass, possessing all the properties of picropodophyllin. Several elementary analyses gave carbon 67·71, hydrogen 5·31 and oxygen 26·98.

Podophyllotoxin is a very bitter, amorphous substance, soluble in dilute alcohol and hot water; from the latter solution it is precipitated very slowly upon cooling in the form of fine flakes, so that the water retains the bitter taste for 24 hours. From the alcoholic solution it is likewise precipitated, but very slowly as an extremely fine powder on the addition of a considerable amount of water. It is most readily soluble in chloroform, but is also soluble in ether when completely free from podophyllinic acid; it is insoluble in petroleum ether, and has a slightly acid reaction. Alcoholic solutions of podophyllotoxin are completely neutralized by warming with the alkaline earths. Aqueous solutions of the caustic alkalies, potassa and soda, neutralize the acid portion of podophyllotoxin without warming; ammonia water neutralizes likewise, and after its evaporation the acid reaction again appears. On the neutralization of the etherial solutions of podophyllotoxin with lime or baryta water, a portion of it passes into the aqueous solution while the other portion crystallizes from the ether in the form of white silky needles. With the aid of the microscope this phenomenon can be observed immediately after the addition of the solution of the alkaline earth to the etherial podophyllotoxin solution. The crystals thus formed are picropodophyllin. When the solution of podophyllotoxin in ammonia water or in dilute alcohol, in which picropodophyllin is insoluble, is neutralized, the latter crystallizes in small, fine, stellate groups of crystals, which with the resinous picropodophyllinic acid (accompanying the podophyllotoxin) form spheroidal granules. These spheroidal formations solidify in saturated alkaline solutions of picropodophyllinic acid to a jelly-like mass. If the alkaline compound of the acid of podophyllotoxin is now decomposed by any acid which with the alkali forms a soluble salt, then one can obtain separately the crystalline picropodophyllin, as also the acid of the podophyllotoxin with which the separated picropodophyllin was associated. The acid of the podophyllotoxin is the above-mentioned picropodophyllinic acid. The separated picropodophyllin becomes dissolved in the picropodophyllinic acid by long-continued heating, and by the evaporation of this solution to dryness, an amorphous, resinous substance is again obtained which possesses all the properties

of podophyllotoxin, *i. e.*, when treated as above mentioned, it yields picropodophyllin in the form of snow-white crystals, etc. By the precipitation of the alcoholic solution of this horn-like mass, pulverulent podophyllotoxin is obtained; this succeeds still better when the solution in chloroform is precipitated with petroleum ether. The elementary analysis of podophyllotoxin is given in the further description of picrodophyllinic acid. Podophyllotoxin is admirably assimilated by the animal organism, as well by the introduction of its solutions in very dilute alcohol into the stomach as also by sub-cutaneous injection. The action is precisely the same as with picropodophyllin, since this forms exclusively the active principle of podophyllotoxin, the latter acts even more quickly, as in the organism the picropodophyllin cannot crystallize from the podophyllotoxin solutions unless free alkalies are present in the stomach, or have been added to the medicine containing the podophyllotoxin; the separation of the picropodophyllin then takes place in proportion to the amount of free alkali present. Pure podophyllotoxin forms a white, resinous powder, which is completely soluble in chloroform, and in the latter solution the addition of ether should not produce a flocculent precipitate, which would indicate an admixture of podophyllinic acid. The podophyllotoxin solution should also not produce a dark-brown color with ferric chloride, indicative of an admixture of podophylloquercetin.

Picropodophyllinic acid is in respect to its action without significance, but is so far of interest, as it holds in solution the only active, and in water insoluble, constituent of the officinal podophyllin,—the crystalline picropodophyllin,—and renders the latter for the animal organism capable of assimilation. The acid is with great difficulties freed from the last traces of picropodophyllin, which, after the neutralization of the picropodophyllinic acid by means of alkalies, crystallizes out. It is a resinous acid, separates on the addition of water to the alcoholic solution, and is precipitated in a flocculent form when the aqueous solutions of its compounds with the alkaline earths are acidulated. If these flocculent precipitates be dried, they form granules of a horny appearance, which are readily soluble in alcohol, chloroform and ether. After the decomposition of the above compounds by acids, a portion of the picropodophyllinic acid remains at first dissolved in the water, but is gradually also precipitated in a flocculent form. In hot water the acid is soluble, but separates again upon cooling. Of more interest are the relations of picropodophyllinic acid to picropo-

dophyllin, which latter is concealed to a certain extent by the separation of the former, and this behavior causes the gelatinous-like coalescence of officinal podophyllin on treatment with alkalies.

If podophyllotoxin, having an acid reaction, be mixed with the aqueous solution of an alkaline earth, *e. g.*, with lime or baryta water, and warmed upon the water-bath with the occasional addition of fresh portions of the alkaline earth solution, until the podophyllotoxin, which slowly dissolves, has become perfectly neutralized, a solution is formed which is only slightly turbid, from small amounts of impurities; upon cooling, this solution solidifies to a gelatinous mass, which, from a more concentrated solution, can be obtained in the form of adhering lumps. If to the hot filtered solution an acid be gradually added, forming with the barium or calcium a soluble salt, a flocculent precipitate is produced which, under the microscope, appears as a granular, transparent, gelatinous mass, in the spheroidal granules of which exceedingly delicate, stellate crystalline forms may be observed. The liquid is now filtered, and the precipitate on the filter is washed until the acid is completely removed. The residue upon the filter is dissolved in water by the aid of heat, and filtered into a previously warmed evaporating dish. Upon slowly cooling, snow-white, radiating groups of crystals are formed within the gelatinous mass, and the entire substance becomes subsequently like jelly. Under the microscope the entire mass is seen to consist of the previously mentioned spheroidal granules, mixed with delicate, needle-like bundles; the crystals are picropodophyllin, while the transparent, gelatinous, granular mass consists of resinous picropodophyllinic acid, in which a portion of the picropodophyllin is dissolved and another portion crystallized; for free picropodophyllin, when not dissolved in the resinous picropodophyllinic acid or glacial acetic acid, can only appear in the presence of water in the crystalline form. When the water is removed from the gelatinous mass by evaporation on the water-bath, there appear with the increased concentration snow-white, needle-shaped crystals, which, after the complete removal of the water, fill the entire vessel, and form a compact felt-like aggregation. The reaction of this crystalline mass is acid, and in consideration of the uniformity of the snow-white crystals, they could be easily presumed to be the crystallized picropodophyllinic acid. The author himself was led to this incorrect supposition, but finally succeeded in separating from the crystalline mass two special bodies. On treating the mass with ammo-

nia, for the purpose of neutralization, it was observed that the snow-white crystals remained undissolved, while the ammonia solution became neutral. The liquid portion was warmed upon the water-bath, and after the removal of the last traces of water, the free ammonia is not only volatilized, but also that in combination with the organic acid of the podophyllotoxin, so that the reaction again becomes acid. The latter substance is nearly colorless, and forms, after drying completely, horn-like laminæ or granules, which are readily soluble in even very dilute alcohol, in ether and chloroform, but in water only by the aid of heat. These laminæ or granules are picroyodophyllinic acid; in the latter the crystallized picropodophyllin dissolves, whereby the above-mentioned gelatinous liquids are formed, as also the spheroidal forms with the enclosed crystals. From these artificial solutions the crystallized picropodophyllin can again be obtained. Picropodophyllinic acid forms with barium and calcium neutral compounds, in which the picropodophyllin dissolves by warming upon the water-bath, but crystallizes out after the removal of these bases by other acids. By the continued action of ammonia, the picropodophyllinic acid is partially decomposed, becomes brown and insoluble in water; with caustic alkalies it likewise yields neutral compounds, in which the picropodophyllin at first dissolves, but some time after crystallizes out.

The average of several elementary analyses gave for podophyllotoxin carbon 67·62, hydrogen 7·46 and oxygen 24·92, and for crystallized picropodophyllin, carbon 67·71, hydrogen 5·31 and oxygen 26·98. The analysis of picropodophyllotoxin, of different operations, gave somewhat varying results, which is attributed to the difficulty of freeing it from the small amounts of adhering podophyllinic acid and podophylloquercetin. The analysis of the picropodophyllinic acid presents still greater difficulties, as it is impossible to obtain it chemically pure; before the treatment with ammonia it always contains traces of picropodophyllin, and after the action of ammonia, which is the only method of freeing it completely from picropodophyllin, it contains again new decomposition products which are formed by the action of the former. The picropodophyllinic acid possesses further no pharmacological interest.

Podophylloquercetin.—This crystallizes in the form of very short needles, having a yellow color and metallic lustre. Upon the animal organism it has neither emetic nor cathartic properties. In the use of officinal podophyllin the pains observed in the intestinal canal appear

to be due to the presence of podophylloquercetin, as with animals the pains produced in the abdomen after the administration of podophyllotoxin could only be observed in those cases in which with the latter podophylloquercetin was intentionally mixed. The podophyllinic acid of other authors does not produce these effects. Podophylloquercetin is readily soluble in alcohol and ether, sparingly in chloroform, and completely insoluble in water; with ammonia and caustic alkalies it gives fine bright yellow solutions, and with the alkaline earths insoluble bright yellow compounds. Podophylloquercetin is usually obtained in the form of a yellow amorphous powder, but may with difficulty be obtained from its ethereal solution in crystals. By the prolonged action of ammonia and other alkalies it becomes brown, and is partially converted into an uncrystallizable resinous mass, and partly into dingy acid products of decomposition. By exposure to air, even when perfectly pure, it becomes gradually green, and to this the occasional greenish color of officinal podophyllin is attributed. The melting point of podophylloquercetin is 247 to 250°C.; when melted it begins to blacken, and sublimes partially, being condensed on the cooler parts of the tube in the form of very small shining, needle-like crystals. Ferric chloride colors the solutions dark green, and the microscopic crystals above mentioned are likewise colored. Neutral acetate of lead produces in the solutions orange-yellow precipitates, which are soluble in acetic acid. Submitted to elementary analysis, it gave carbon 59·37, hydrogen 4·01 and oxygen 36·62, and appears to resemble in many respects the other varieties of quercetin.

Podophyllinic Acid.—By this name the author designates the brown amorphous resinous matter which is insoluble in ether and petroleum ether, but soluble in alcohol and chloroform; it is insoluble in water, and exerts, therefore, like the remaining accessory constituents of podophyllin, no action upon the animal organism. The impure appearance of podophyllotoxin, when it has not been treated with ether, depends always upon its admixture with podophyllinic acid.

Fatty Substances.—The fatty oil of officinal podophyllin is always of a greenish color, and is only brown when in the preparation of the podophyllin alum solution has been employed. Another fatty substance, which is dissolved in this oil, crystallizes therefrom in the form of colorless, cholesterin-like laminæ; the fatty oil possesses a peculiar odor, which resembles that of the podophyllum rhizome.

The *extractive matters* of officinal podophyllin, of which nothing special can be said, are all of a dirty grayish-brown color, and of the consistence of sticky, soft resins; they are without action on the animal organism.

Methods of Obtaining the Constituents.—Pure podophylloquercetin can be obtained best from podophyllin prepared specially for this purpose. All the other above-mentioned bodies, with the exception of the picropodophyllinic acid, can be obtained more conveniently and purer from the rhizome than from commercial podophyllin. The picropodophyllinic acid can only be obtained from the podophyllotoxin.

The podophyllotoxin is perfectly adapted for therapeutic uses, being readily assimilated by the animal organism, as proved by clinical experiments made with it in Vienna, and also by the experience of private practice. The crystallized picropodophyllin is in this respect less applicable on account of its unfavorable conditions of solubility.

The best and simplest method for obtaining pure podophyllotoxin for medicinal use is the following: Podophyllum in coarse powder is extracted by digestion with chloroform for 2 days at ordinary temperatures in a glass vessel or percolator, with frequent agitation. If a glass vessel is used, the product of the first digestion is poured off, a fresh portion of chloroform added, again decanted, and subsequently a third portion of chloroform added, whereby each time an amount of chloroform equal to or somewhat more than that of the weight of the podophyllum should be employed. If a percolator is used, fresh portions of chloroform are added until the powder is completely exhausted, and the chloroform subsequently displaced by means of water. The chloroform used must be as free as possible from alcohol, otherwise the extracted matter will contain considerable amounts of podophylloquercetin and podophyllinic acid, which render the purification of the podophyllotoxin difficult. For the same reason the podophyllum is extracted at ordinary temperatures and not upon the water-bath. From the collected and combined liquids the chloroform is distilled off until a residue of a syrupy consistence remains; this is gradually added to 2 volumes of pure absolute ether, or the same portion of ether is gradually added to the chloroform residue, stirring with a glass rod, until by the further addition of ether a flocculent separation is no longer formed. Podophyllotoxin and the fatty substances dissolve in the ether-chloroform, while the

podophyllinic acid is separated in a flocculent form. An insufficient amount of ether with an excess of chloroform leads to the result that a portion of the podophyllinic acid remains in solution, while an excess of ether on the contrary is without injury but rather of benefit in obtaining a proportionately purer preparation; the excess of ether can only in so far be inconvenient as that larger amounts of petroleum ether will be subsequently required to precipitate the podophyllotoxin.

Ether containing alcohol must be absolutely rejected, as then a portion of the podophyllinic acid which is readily soluble in alcohol will remain in solution in the mixture of ether and chloroform, and it is not possible to remove this acid by further treatment. By the aid of ether one can determine whether podophyllinic acid is still contained in the respective liquid; to this purpose ether is allowed to flow in a thin stream on the sides of the capsule containing the podophyllotoxin solution, and it is observed whether floccules are formed. The podophyllinic acid is deposited at the close of the operation and in the course of time in the form of dense lumps on the bottom of the capsule. The liquid decanted from the residue is brought upon a filter and allowed to flow directly into 20 times the amount of pure cold petroleum ether. From each drop falling into the petroleum ether a white powder is separated, while the fatty substances (the fatty oil and crystallive fatty matter) remain in solution. If altogether too small an amount of petroleum ether is employed with an excess of the chloroform-ether mixture, the deposited powder agglomerates or forms small lumps, which partially retain the fatty substances; with the use of a proportionately large excess of the chloroform-ether a portion of the powder becomes dissolved. The agglomeration to small lumps occurs more readily in proportion to the incompleteness of the removal of the podophyllinic acid; the podophyllotoxin must then be subjected to additional purification, for which purpose to the liquid in which in part podophyllotoxin is still contained dissolved fresh portions of petroleum ether are added until complete precipitation is effected.

The precipitate is filtered from the petroleum ether and dried at a temperature not exceeding 35°C. The residue is again dissolved in the smallest possible quantity of chloroform, the solution brought upon a filter, and again allowed to drop into a sufficient amount of petroleum ether, whereby a few drops of water are added in order that the precipitated powder may become slightly moistened with water.

The powder is allowed to completely deposit, for which a repose of 24 hours is sufficient, and, after carefully removing the water, it is brought upon a filter, the petroleum ether allowed to drain off, and the residue dried at the above mentioned moderate temperature. By proper treatment there is obtained upon drying an almost completely white or slightly yellowish-white powder of podophyllotoxin. The latter is not decomposed by light and can therefore be preserved in ordinary glass vessels.

Podophyllotoxin can also be obtained from the officinal podophyllin, although it must hereby be considered that the latter contains not only considerable amounts of podophyllinic acid and podophylloquercetin, but also many products of decomposition which are formed by the extraction of the rhizome with boiling alcohol and subsequent evaporation of the solutions. These decomposition products are readily taken up by chloroform and it is afterwards difficult to separate them from the podophyllotoxin; the latter prepared from the officinal podophyllin is always of a more yellow color than that obtained from the rhizome; the method of obtaining it is the same as that above described.

Pure podophyllotoxin must dissolve readily in chloroform, and this solution should give no precipitate on the addition of ether. Ferric chloride should not color it green and on the addition of petroleum ether to the chloroform solution it must be precipitated as a white powder. In ammonia water it should not be completely soluble; ammonia should dissolve simply the picropodophyllinic acid from the podophyllotoxin, which solution on standing for some time becomes somewhat colored; the picropodophyllin must hereby separate out, in consequence of which, if the amount of ammonia is not too large, a thick gelatinous mass is obtained. If to this mass or to a mixture of podophyllotoxin and ammonia ether be added, gently warmed and agitated, the picropodophyllin should dissolve in the ether, and, after cooling and volatilization of the latter, it should crystallize out in the form of delicate, colorless crystals.[1]

The preparation of pure crystallized picropodophyllin can be effected as easily from the officinal podophyllin as from the podophyllum rhi-

[1] The method here described for obtaining podophyllotoxin, by means of which the podophyllinic acid is completely removed, is an improvement and addition to that previously published by the author in "Archiv für exper. Pathologie und Pharmacologie."

zome; as the starting point, however, podophyllotoxin should be selected.

In the preparation of podophyllotoxin for obtaining picropodophyllin, the former does not require to be freed from the podophyllinic acid. From every variety of officinal podophyllin the podophyllotoxin must be extracted in the same way as from the podophyllum rhizome; the concentrated chloroformic solution, however, does not require to be mixed with petroleum ether, and this relatively expensive operation can be avoided by evaporating the chloroformic solution upon the water-bath until the chloroform has completely volatilized, and subsequently boiling the residual brownish-yellow mass with fresh portions of petroleum ether until greenish fatty matters are no longer taken up and the entire mass is converted into a granular powder.

During the boiling the mass must be continually actively mixed with the petroleum ether, in order that it become thoroughly penetrated. After the removal of the fatty matters, it swells up, and finally falls to a powder, which consists of impure podophyllotoxin with the adhering impurities.

In order to prepare the crystallized podophyllotoxin, the obtained powder is dissolved in a small amount of alcohol, and a considerable excess of freshly slaked lime added; the mixture is then evaporated on the water-bath to dryness, with constant stirring. The granular powder obtained by evaporation with lime is finely powdered, brought into a glass flask, and boiled on the water-bath with absolute or at least 90 per cent. alcohol. The alcohol thus takes up the picropodophyllin from the lime mixture, and the solution is brought upon a previously warmed filter. The funnel with the filter must of necessity be heated with warm water, otherwise a considerable amount of podophyllotoxin will crystallize out on the filter, become mixed with the lime powder, and retard the filtration. From the sufficiently concentrated alcoholic liquid the picropodophyllin crystallizes out upon cooling in long, snowy, silk-like crystals. The lime powder remaining on the filter is boiled with fresh portions of alcohol as long as anything is taken up and upon cooling needle-shaped crystals continue to be separated. The picropodophyllin crystals are collected on a filter, and washed with 50 per cent. alcohol to which a little of an aqueous or alcoholic solution of ammonia has been added; the 50 per cent. alcohol dissolves the foreign colored admixtures, while the ammonia removes the last traces of the picropodophyllinic

acid. The properly washed picropodophyllin crystals aggregate to a felt-like mass; after drying at a moderate temperature on the filter they are finally obtained in the form of a snow-white mass, having a silky lustre. The alcoholic picropodophyllin solutions have an intensely bitter taste. The alcoholic filtrate and wash liquids are concentrated on the water-bath to a small volume, and the picropodophyllin still contained therein allowed to crystallize out.

Preparation of the Remaining Constituents of the Officinal Podophyllin.—The picropodophyllinic acid can be isolated from the podophyllotoxin by treating the latter with ammonia water. It is, however, very difficult to obtain the pure acid in an amount sufficient for chemical examination, as ammonia water, which is the only substance which can be employed for its isolation, causes its decomposition. The resinous podophyllinic acid is separated in the process for podophyllotoxin, when to the chloroform solution of the impure principle ether is added. Absolutely pure podophyllinic acid is obtained when the precipitate produced by ether is further carefully washed with ether for the purpose of removing the podophyllotoxin; this operation, however, is wearisome, as the precipitate must be treated several times with chloroform and ether.

The fatty matters may both be obtained from the petroleum ether solutions which remain from the preparation of the podophyllotoxin. The petroleum ether is either distilled off or expelled by evaporation, whereby the crystalline fatty matter crystallizes out from the residue upon long standing. It is pressed between bibulous paper and purified by repeated solution and recrystallization.

Podophylloquercetin can be best obtained from such varieties of podophyllin as have been prepared without the employment of alum water. From the podophyllin all the constituents which are soluble in chloroform and petroleum ether are first removed, the residue dried, and then treated with ether, whereby the podophylloquercetin is chiefly dissolved, with only small admixtures of foreign products. The ether is then dissipated by evaporation at the lowest possible temperature, and the residual yellowish body treated with acetate of lead, with which the podophylloquercetin forms a compound of a yellow color, soluble in acetic acid. This compound is decomposed in the usual way, the podophylloquercetin taken up with ether, which becomes thereby of a yellow color, and the podophylloquercetin finally obtained in the form of a yellow powder which, by exposure to the

air, gradually assumes a greenish color. From the ammoniacal solution it is precipitated by ether in the form of microscopic crystals. By the sublimation of the yellow powder obtained after the evaporation of the ether, yellow vapors are formed which, upon cooling, form well-developed, yellow shining, needle-shaped crystals of podophylloquercetin.

The author finally again calls attention to the fact that the action of podophyllin is due to the therein contained neutral and crystallizable picropodophyllin, which is dissolved in the picropodophyllinic acid, forming together the resinous podophyllotoxin, but does not consider the latter a chemical compound, as would be found in the case of the combination of an acid and alkali. He also explains the observations of previous experimenters that the action of podophyllin is diminished or destroyed by the influence of alkalies, from the fact that the picropodophyllinic acid with which the active picropodophyllin is associated becomes thereby neutralized, thus rendering the latter insoluble. In the administration of podophyllin or podophyllotoxin, therefore, its combination with alkalies, soap, etc., should be avoided, and in case too large a dose has been inadvertantly employed the proper antidote would be Seidlitz powder, magnesia, or any alkaline draught, which may be followed by emulsion of sweet almonds with cherry-laurel water, or simply the former alone.

The normal dose of podophyllotoxin for an adult, as based upon clinical observations and experiments upon animals, is suggested as $\frac{1}{4}$ grain, to be taken at bed time, and repeated on the following night, if required. In obstinate cases of constipation $\frac{1}{2}$ grain may be given at once, but the maximum dose should not exceed $\frac{2}{3}$ grain. A dose of $2\frac{1}{2}$ grains, if not fatal, is considered very dangerous and absolutely inadmissible. For the rapid assimilation of the substance the following formula is recommended as convenient of application:

℞ Podophyllotoxin, ... grs. iiss
solve in
Alcohol, ... ℈x=f℥iv

S. Dose for an adult 30 drops in wine or brandy.

For children the dose must be proportionally less, and may be given in a spoonful of sweetened water or milk.

It may finally be incidentally observed that the author confirms the observations of previous investigators in regard to the absolute absence of any body of an alkaloidal nature in podophyllum.

PRACTICAL NOTES FROM FOREIGN JOURNALS.

BY THE EDITOR.

Glycerite of Bismuth is best prepared, according to A. Bareau, by triturating the bismuth salt intimately with the requisite quantity of starch and about 5 or 6 parts of water and adding this mixture, with continual agitation, to the glycerin, previously heated to near the boiling point.—*L' Union Phar.*

Lac Ossium is prepared by saturating somewhat diluted hydrochloric acid, by digestion, with bones burned to whiteness, cooling, filtering and evaporating the liquid until it has the specific gravity 1·200. Of this liquid 500 grams are diluted with 6,000 grams of distilled water, poured into a cold solution of 330 grams of pure sodium carbonate in 6,000 grams of distilled water, and the precipitate is washed by decantation until the washings cease to react with nitrate of silver. The yield is 3,000 grams. It is important that the precipitation be effected in the cold and from a strongly diluted solution.—*Phar. Ztg.*, No. 89, 1881; *Phar Weekbl.*

Saccharated Iodide of Iron, according to A. Jandous, may be rapidly prepared by dissolving iron with iodine in the presence of 50 per cent. alcohol; no secondary products are formed, and the final exsiccation is accomplished in so short a time that the preparation may be almost made extemporaneously.—*Phar. Post*, No. 24, 1881.

Tectrion is the name given to a solution of magnesium chloride, recommended for use as a non-freezing liquid. It is, however, not adapted for gas meters, since it corrodes iron. It has also been-used for increasing the weight of dyed yarns. In 1865 magnesium chloride was recommended by Dr. A. Frank in the preparation of fire-brick for puddling furnaces.—*Zeitsch. Oest. Ap. Ver.*, 1881, p. 446.

Preparation of Butter of Antimony.—Liquor stibii chlorati of the German Pharmacopœia is of variabe composition, owing to the impurities present in the crude material. Prof. E. Reichardt recommends the following process for its preparation: 1 part of powdered sulphuret of antimony is mixed in a capacious flask with 4 parts of crude hydrochloric acid, and the mixture gradually heated to boiling, and until sulphuretted hydrogen is no longer evolved in the presence of undecomposed black antimony. The liquid is filtered, diluted with 6 volumes of water, the precipitated antimony oxychloride washed upon a filter with water and dried between 20 and 30°C. One part of the

air-dry powder is treated for 24 hours with $3\frac{1}{2}$ parts of pure hydrochloric acid and with frequent agitation, but without heat, when the liquid is filtered; the proper specific gravity, 1·34 to 1·36, is obtained either by dilution with hydrochloric acid or by evaporation in a water bath.

Thus prepared it is a colorless or pale yellowish liquid, which is completely volatilized by heat, and when diluted with 5 parts of water yields a perfect solution on the careful addition of sulphuric acid (absence of lead). Treated with an excess of ammonia and filtered, the liquid is clear and not blue (absence of copper). When heated to 50 or 60°C. (122 to 140°F.) a current of sulphuretted hydrogen should not cause the separation of either sulphur or sulphide of arsenic.—*Archiv d. Phar.*, Nov., 1881, p. 347.

Extractum Krameriæ.—Prof. E. A. Vander Burg has made a number of experiments with the view of determining the causes of the different behavior of commercial extract of rhatany. The Peruvian root exhausted by cold water yielded 10·5 per cent., and by decoction 18·5 per cent. of extract, while Savanilla rhatany gave 14·75 and 20·50 per cent. Of these extracts that of the Peruvian root, prepared with cold water and by evaporation *in vacuo*, was of a light red color (not brown), readily and completely soluble in water, had the strongest astringent taste, and gave the strongest reactions for tannin; a one per cent. solution yielded with lead acetate a nearly white, slightly rose-colored precipitate, with ammonia a bright blood-red color, and with lime water a light red precipitate. The corresponding reactions with the other extracts were mostly much darker, as were also the precipitates with cinchonine sulphate and with tincture of iodine. For the preparation of *syrupus iodotannicus* 0·1 gram iodine was dissolved in 2 cc. alcohol, of spec. grav. ·828, and the solution mixed with 0·4 gram of extract, previously triturated with 4 cc. water; with the extract prepared by cold water and evaporation *in vacuo* the reaction of free iodine had completely ceased in 24 hours, while it was still evident with all the other extracts after six weeks, evidently due to the decomposition of a portion of the tannin during the preparation.

No characteristic difference could be observed between the extracts prepared from the cold infusion by evaporation at the ordinary temperature, in the water-bath or over the naked fire; nor between the extracts prepared from decoctions of the root and evaporated in the manner indicated; the latter extracts were invariably dark in color,

and with reagents yielded the darkest colored reactions. The Savanilla extracts were always darker than the corresponding extracts from Peruvian rhatany. Commercial *extractum krameriæ americanum* agreed in all respects with the extract obtained from Savanilla rhatany with cold water; but the commercial rhatany extract "in lamellis" differed to such an extent from all extracts prepared from Peruvian and Savanilla rhatany, as to warrant the inference of its being prepared from an entirely different drug; it has no astringent taste, is but slightly soluble in strong alcohol, its aqueous solution yields a strong precipitate with alcohol, and the precipitates with all reagents had a color differing materially from the precipitates obtained with the other extracts.—*Phar. Ztg.*, 1881, No. 103; *N. Tydschr. voor Phar.*, Oct.

Tannin of Oakbark is obtained by treating the alcoholic extract with water and saturating the solution with sodium chloride, when tannic anhydride will be deposited. On agitating the liquid with ether, some gallic and ellagic acid is removed, and on agitating now with acetic ether the tannin dissolves, and on evaporation, is left as a reddish-brown brittle mass, which gives with ferric salts a blue-black, and with tartar emetic, gelatin, albumen and alkaloids, yellowish-white precipitates. The formula for the anhydrous tannin is $C_{28}H_{24}O_{12}$; it is not a glucoside, but on treatment with dilute acids yields oak-red, $C_{28}H_{22}O_{11}$. —*Zeitschr. Anal. Chem.*, xx, 208–223.

Administration of Tannin.—The unpleasant effects often observed on giving solution of tannin or powdered tannin are, according to Dr. L. Lewin, entirely obviated by combining it with albumen. On adding the filtered solution of one white of egg in 100 grams of water to a 1 or 2 per cent. solution of tannin, and agitating the mixture well, an opalescent slightly milky liquid is obtained, which has a far less astringent taste than the simple solution of tannin, and, suitably diluted, may even be given to babies with good result.—*Parm. Post*, 1881, p. 427.

Solubility of Chinoline Compounds.—Dr. Julius Donath experimented with chinoline salicylate prepared by E. Schering, and found it to be not completely soluble in 100 parts of water, and the paraoxybenzoate of chinoline even in 120 parts of water. Both salts do not even yield a one per cent. solution with alcohol of 10 per cent., although both are freely soluble in strong alcohol; they cannot, therefore, be easily administered in liquid form, and no observations have been made with their administration as powder, followed by strongly alcoholic or

by acidulous drinks. Chinoline tartrate seems to deserve the preference of all known compounds of the alkaloid, the solubility being intermediate between the deliquescent compounds with mineral acids, and the sparingly soluble ones with the aromatic acids.—*Phar. Ztg.*, 1882, No. 2.

Large Dose of Chloral Hydrate.—Contrary to the physician's directions, a man suffering from delirium tremens took in about half an hour 15 grams of chloral hydrate without any ill effects. The editor of "Pharm. Zeitung" (1881, No. 98) directs attention to a case which occurred in Elberfeld in 1874, and in which the same dose, 15 grams, produced death. The maximum dose of chloral hydrate is, in Germany, assumed to be 3 to 4 grams, and in a day 8 grams.

Toxic Effects of Monobromated Camphor were observed by Prof. M. Rosenthal, 1 gram being taken in one case and in another 3 grams, the patient remaining unconscious for six hours, recovering consciousness only after violent vomiting. The treatment recommended consists in giving an emetic, afterwards acetic ether, coffee with rum, and in case of a considerable reduction of the temperature of the body, in friction with warm clothes, etc.—*Phar. Ztg.*, 1881, No. 94.

Compound of Strychnine with Iodoform.—According to Lextrait such a compound may be obtained when 5 grams of crystallized iodoform and 12 grams of strychnine are dissolved in about 500 cubic centimeters of 85 per cent. alcohol at a temperature approaching the boiling point. After 24 hours crystals separate from this solution, which are washed with a little alcohol, quickly pressed between bibilous paper, and dried with exclusion of the light and air. The compound has the composition $(C_{21}H_{22}N_2O_2)_3CHI_3$. It is decomposed by light with the separation of iodoform. It is insoluble in both hot and cold water; alcohol of 98 per cent. dissolves 3·40 grams in a liter at 15°C.; in ether and chloroform it is likewise soluble. On being heated to 90°C., it begins to decompose, and chars at 130°C. With boiling water it is decomposed with the volatilization of iodoform, while stychnine remains; the alcoholic solution suffers a partial dissociation, so that it is easy to purify the compound by repeated crystallization from alcohol without a large portion becoming decomposed. With quinine iodoform appears to form a similar compound.—*Pharm. Zeitung*, No. 94 from *Journ. Pharm. Chem.*

A Correctant of the Odor of Iodoform.—Otto Ruetz finds the substance best adapted for diminishing or concealing the disagreeable odor of

iodoform to be the oil of thyme, to which a little thymol may be advantageously added. It is preferable to oil of peppermint, oil of bitter almond, etc., and, as an example, it is stated that for a solution of from 1 to 2 grams of iodoform in 30 grams of collodion the addition of 1 decigram thymol is sufficient.—*Ibid.*

Pilocarpine as an Antidote for Atropine is recommended by Dr. Joseph Kauders. It is employed by injecting 1 to 3 centigrams hypodermically at intervals of from 30 to 50 minutes until the action of the pilocarpine is produced. He also calls attention to the probability of the successful application of atropine as an antidote for pilocarpine.—*Ibid.*, from *W. Med. Wochenschr.*, No. 45.

Extract (Esprit) Ylang-Ylang.—Best oil of ylang-ylang 10 grams, oil of rose 2 drops, oil of orange flowers 10 grams, tincture of musk 20 to 30 grams, spirit of jasmine 900 grams, orange flower water 100 to 150 grams.—*Phar. Ztg.*, 1881, No. 96.

Boonekamp of Maagbitter.—The following two formulas have been communicated to "Phar. Zeitung," 1881, No. 92:

1. Orange berries 100·0, orange peel 30·0, gentian 60·0, cascarilla 30·0, curcuma 15·0, cinnamon 25·0, cloves 15·0, rhubarb 7·5; alcohol (sp. gr. ·834) 750·0, and water 165·0 grams; digest, filter and add oil of staranise 40 drops, sugar 250·0 grams.

2. Orange peel 20, cascarilla and gentian of each 15·0, rhubarb and curcuma of each 10·0, alcohol 400·0, water 500·0, sugar 100·0 grams.

COMPOUND SOLUTION OF THE HYPOPHOSPHITES OF IRON, SODA, LIME AND MAGNESIA.

By Adam Gibson.

Read at a meeting of the North British Branch of the Pharmaceutical Society, January 11, 1882.

Within the last two or three years the hypophosphites have been gaining favor with medical men, and are gradually replacing the phosphates in the treatment of those cases where it is desired to introduce phosphorus into the system, either alone or in combination with iron and other bases. This is not surprising if we take into account the fact that phosphorus is held more loosely in the hypophosphites than in the phosphates, and that it might accordingly be expected that its assimilation by the various tissues requiring it would be much more readily effected from the former than from the latter.

The extreme solubility of the hypophosphites is another important point in their favor; all the alkaline and earthy salts of hypophosphorous acid being readily soluble in water, while the corresponding salts of phosphoric acid are nearly all insoluble in that menstruum, requiring the addition of a strong acid to effect solution. In fact doubts have been expressed as to whether the phosphates are assimilated in the system at all, or whether the benefit derived from their use does not depend upon the action of the bases alone.

For many years a preparation of hypophosphites has been before the profession, and latterly another preparation has been introduced from the other side of the Atlantic, but neither of these gives the proportionate amount of hypophosphites in solution, consequently prescribers are working in the dark, while both are very expensive preparations, and, therefore, not suitable for general use.

A much more satisfactory preparation than these is that recommended by Dr. Frederick Churchill, of the Victoria Hospital for Children, London. The formula of this preparation he published in an article communicated to the "British Medical Journal" for March 27, 1880.

Having been desired to make a quantity of this preparation and seeing the interest taken in the administration of hypophosphites at the present time, I have thought that the subject would not be an unsuitable one to bring before you for discussion.

It will be observed that the bases entering into the formula, which I shall now give you, are similar to those of Parrish's syrup, with the exception of the magnesium salt, the author of the formula substituting this for the potassium salt, owing to some objections which attend the administration of the latter:

	Grains in 100 minims.	Grs. in fl. ʒi.
Ferrous Hypophosphite ($FeOPH_2O_3+6H_2O$) .	2·77	1·6
Calcium Hypophosphite ($Ca_2PH_2O_2$) . .	3·5	2·
Sodium Hypophosphite ($NaPH_2O_2+H_2O$) .	3·5	2·
Magnesium Hypophosphite ($MgPH_2O_2+6H_2O$)	1·99	1·1
Hypophosphorous acid (H_3PO_2) . .	1·66	
Water	86·58	
	100·00	6·7 grs. mixed salts.

It will be observed that the formulæ for the ferrous, calcium and

magnesium hypophosphites are incorrectly stated, the correct formulæ for the salts being

$$Fe(PH_2O_2)_2+6H_2O,\ Ca(PH_2O_2)_2,\ Mg(PH_2O_2)_2+6H_2O.$$

This of course involves a great difference in the amount of hypophosphorous acid present in these salts, which in the case of the ferrous and magnesium salts is understated to the extent of one-half, and in the calcium salt to the extent of three-fourths.

With the view of securing the iron in a ferrous condition, double decomposition with ferrous sulphate and calcium hypophosphite was had recourse to (in preference to the uncertain method of saturating the hydrate, or the slow process of dissolving metallic iron in hypophosphorous acid), and having assured myself that this could be accomplished, the sodium and magnesium hypophosphites were made in the same way.

The only drawback to the preparation of the various hypophosphites from calcium hypophosphite, and the corresponding sulphates, is the formation of sulphuretted hydrogen in the solution, after it has stood for a little time. This result you may imagine would give considerable annoyance were its formation not obviated by the adoption of a proper method to ensure double decomposition between the sulphates and calcium hypophosphite, without the possibility of any bye-products, so to speak.

The sulphuretted hydrogen may arise in the following manner. It is well known that hypophosphorous acid acts as a powerful reducing agent, so that when brought into the presence of sulphuric acid (either pure or as sulphate) the sulphuric would be reduced to sulphurous and the hypophosphorous raised to phosphorous acid, thus,

$$HPH_2O_2+H_2SO_4=H_3PO_3+H_2SO_3.$$

Sulphurous acid again acting upon a fresh molecule of hypophosphorous acid would raise it to phosphorous acid with liberation of sulphur, thus,

$$2HPH_2O_2+H_2SO_3=2H_3PO_3+S+H_2O.$$

But this sulphur would not be found as such, for being in the presence of a reducing agent of so great power as hypophosphorous acid, the following action will in all likelihood ensue:

$$HPH_2O_2+S+H_2O=H_3PO_3+H_2S.$$

At all events, it is certain that sulphuretted hydrogen is formed in the solution under certain conditions, and I merely suggest these reactions as those which may probably take place.

In order to obviate these objectionable reactions, I have adopted the plan of dissolving all the salts in hot water, since if decomposition takes place in the cold it is prolonged, and may give rise to the above reactions; whereas by the employment of hot water the change ensues immediately, and thus contact between the acids is avoided.

It will be observed in the undernoted formula, that the hypophosphorous acid is stated as containing 30 per cent. HPH_2O_2; this has been found to be about the usual strength of the acid supplied by the wholesale houses.[1] The acid also usually contains traces of sulphuric acid, which slightly interferes with the finished product by precipitating a little lime as sulphate from the calcium hypophosphite added at the end of the process.

The working formula is as follows:

2 oz. 382 grs. $FeSO_4,7H_2O + 1$ oz. 332 grs. $Ca(PH_2O_2)_2 = 2{\cdot}77$ $Fe(PH_2O)_2,6H_2O$

5 oz. 364 grs. $Na_2SO_4,10H_2O + 3$ oz. 35 grs. $Ca(PH_2O_2)_2 = 3{\cdot}5$ $NaPH_2O_2,H_2O$

2 oz. 22 grs. $MgSO_4,7H_2O + 1$ oz. 182 grs. $Ca(PH_2O_2)_2 = 1{\cdot}99$ $Mg(PH_2O_2)_2$, $6H_2O$.

3 oz. 368 grs. $Ca(PH_2O_2)_2 = 3{\cdot}5$ $Ca(PH_2O_2)_2$.

$5\frac{1}{2}$ fl. oz. HPH_2O_2, $70H_2O = 1{\cdot}66$ HPH_2O_2.

Method of Procedure.—Dissolve the whole of the calcium hypophosphite required to decompose the sulphates (6 ounces 112 grains) in 50 ounces of water; bring the solution nearly to boiling point, and acidify with half an ounce of the hypophosphorous acid; then stir in the ferrous, sodium and magnesium sulphates; double decomposition ensues almost immediately. After stirring two or three minutes, throw the whole on a paper filter, and wash the precipitate with hot water to 70 ounces.

Dissolve the 3 ounces 368 grains calcium hypophosphite in 25 ounces of water; filter, mix the filtrates, add to the solution the remaining 5 ounces of hypophosphorous acid, and make up with water to 100 ounces.

[1] The percentage was determined in the following manner: a known quantity of freshly calcined lead oxide was mixed with a known quantity of the commercial acid; to this a little nitric acid was added, and the whole evaporated and calcined; the weight of the product, after deducting the amount of PbO, gave the amount of acid present as P_2O_5, from which the amount of HPH_2O_2 was calculated.

Volumetric solution of soda gives a nearly similar result.

During a few days after its preparation it deposits a minute quantity of calcium sulphate, from which, however, it may wholly be freed by decantation or filtration.

This forms a clear and permanent solution; it may be mixed with simple syrup, claret and glycerin in any proportions, but the salts are gradually deposited from mixtures containing an appreciable percentage of alcohol.—*Pharm. Jour. and Trans.*, January 21, 1882.

IODINE-YIELDING ALGÆ—A PROPOSAL FOR THEIR MORE DIRECT USE IN PHARMACY.

By James Wheeler.

Read at an Evening Meeting of the Pharmaceutical Society, Feb. 1, 1882.

Some four years ago a London physician having described the topical employment of *Fucus vesiculosus* in the case of a patient living far inland, the writer was communicated with, and, by arrangement, undertook for a lengthened period the forwarding of the required supply of fresh fronds—the upper one-third being the part selected.

Since that time, circumstances having brought the writer to a part of the coast where algæ are to be seen in greater variety and luxuriance than he had ever before had experience of, he was led upon reflection to question why *Fucus vesiculosus* obtained, as a remedial agent, a monopoly of favor, both with the profession and with the general public.

Starting thereat with the assumption that the relative therapeutic value of the various algæ would be found to be in proportion to their contained iodine, and, furthermore, that this element might also be probably possessed by them in the ratio of their more or less total submergence at all states of the tide, he was, by mere curiosity, led to look up the literature of the subject in so far as his too slender library afforded the means. Sufficient to say that Muspratt's "Chemistry"—article, Iodine; Stillé and Maisch's "National Dispensatory"—articles, *Fucus vesiculosus* and *Chondrus crispus;* together with the manuals of materia medica and chemistry common to all pharmacies, failed to supply other than conflicting information concerning the percentages of iodine yielded by the various kelp-producing algæ. Indeed, it may, perhaps, be reasonably questioned whether, in the light of mod-

ern methods of iodine manufacture, the data afforded by analyses long since made upon the faulty system of open combustion, as the first step in the process, are to be considered as trustworthy indications of the amount contained in the fresh plants. Failing, therefore, to obtain the desired information from the published analyses at his command, he was led to make some simple experiments, which should indicate approximately the relative yield by some of the more ordinary species. Those selected for the purpose being (1) *Laminaria flexicaulis*, (2) *Laminaria saccharina*, (3) *Fucus vesiculosus*, (4) *Fucus nodosus*, (5) *Fucus serratus*, (6) *Rhodymenia palmata*, (7) *Chondrus crispus*, of each of which, sliced fresh fronds, in the proportion of 1 to 8 of water, with the exception of No. 7, were twice boiled, until the two decoctions when mixed, equaled one-half the water employed. These, when cold, were treated with starch paste, and at regular intervals successive minute quantities of chlorine, both noting the intensity of color produced and the amount of reagent required to discharge the colors. Iodine reactions were abundantly manifested by Nos. 1 and 2, and in much less degree by No. 4, all the others affording but negative results. Other decoctions were made, substituting dry fronds for fresh, with the result that No. 5 afforded faint signs of iodine.

Confirmatory testings were made with nitrous acid and bisulphide of carbon. This may be taken as the substance of repeated experiments, both with water and proof spirit as the menstruum. Of *Fucus vesiculosus*, however, it should be remarked that upon evaporating off the last remaining portion of the menstruum of a proof spirit tincture, the residue afforded some slight indications of the presence of iodine, and indeed, considering the universality of this element in sea water, readily evidenced when concentrated to about a seventh its bulk, it would be difficult to conceive a truly marine algæ failing to contain it in some minute proportion. Nor is its presence confined to plants; fishes, as is well known, especially the genus *Gadus*, affording an oil yielding traces of it. Oysters, likewise, have been proved to contain it. Sponge, also, by virtue of it as a constituent, afforded a remedy which, until Courtois' discovery, was deemed, to quote the words of an old writer, "an effectual cure for bronchocele and of infinite service in all scrophulous complaints." Even quite lately, burnt sponge has been prepared by some on the continent as proving less irritant than the preparations of iodine.

Whether upon consideration of the foregoing—which amounts simply to the long known fact of their being richest in iodine—the Laminariæ should, for medical employment, be preferred to ***Fucus vesiculosus*** and its congeners must of course be for the profession alone to determine. As pharmacists, however, we are already within our province in stating our grounds for the therapeutic investigation of new remedies. Of the direct employment of Laminariæ in this sense or even popularly in this country, I have been unable to obtain information. Dr. Royle, however, states that laminaria from the Euxine or Caspian Sea, or from the Persian Gulf, finds its ways to the foot of the Himalayas, where it is employed as a cure for goitre; also that in South America the stems are sold by the name of goitre sticks, because they are chewed by the inhabitants where goitre is prevalent. Now it may be here remarked that the mere consideration of these, perhaps, *primâ facie* grounds for therapeutical inquiry, would have been deemed by the writer wholly insufficient to have warranted his claiming the attention of this meeting had not he, whilst separating the iodine from a decoction of *Laminaria saccharina*, been impressed with the probability, and after trial, assurance of the capability of the decoction of the latter to emulsify cod liver oil both easily and perfectly, and, thus far, with so much promise of therapeutical fitness for the purpose as to well nigh warrant the belief that a long felt desideratum had by it been obtained.

Thr following notes and formulæ embody the results of the writer's investigations:

Laminaria Cloustoni.—The fronds of this yield a decoction rich in iodine, though perhaps in somewhat less measure than *L. flexicaulis.* The writer is unable to suggest any particular employment for which it should be preferred to the other members of the genus. From the facility, however, with which its fronds are powdered, it would afford a cheap and possibly useful compound of a resolvent poultice or, on paper after the manner of charta sinapis or some more flexible material after the fashion of the popular porous plasters, supply on soaking in water a convenient application to scrofulous joints, etc.

Laminaria flexicaulis.—This doubtless is the richest of all algæ in iodine, which it yields from the fronds in larger percentage than either the stem or root. Maceration with water or proof spirit is found to extract its iodides. Seawater, also, whether of normal density or con-

centrated down to 5 volumes in 1, serves equally as a menstruum and offers, in addition to its possibly enhanced therapeutic quality, the property of keeping well. It is possible the profession may one day find a varied employment for the presumably useful therapeutic properties of this species.

The writer would suggest the following formulæ for its employment:

Infusion of Laminaria flexicaulis.

Take of dried and sliced fronds, . .	1 part.
Water, ...	10 parts.

Macerate with occasional stirring for four hours and strain with pressure.

Tincture of Lamarinia flexicaulis.

Take of dried and sliced fronds, . .	1 part.
Proof spirit, ...	8 parts.

Laminaria saccharina is of a more complex character than either of the preceding, yielding to decoction 50 per cent. of its weight and affording iodine, bromine, and mannite, the latter shown by Stenhouse to amount to 12 or 15 per cent. of the plant, and a mucilage which in the experience of the writer differs materially from that afforded by any other species. Its emulsifying power has already been alluded to. *Chondrus crispus* will, by virtue of its glutinous quality, give a pseudo-emulsion with cod liver oil, differing optically, however, from the more minute division and permament separation of the oil particles effected by *Laminaria saccharina.* It moreover fails in keeping quality and obviously lacks the therapeutic credentials of the above.

The writer apprehends that the chief use of this species will lie in the preparation of cod liver oil emulsion, for which purpose he submits the following formulæ with confidence:

Decoction of Laminaria saccharina.

Take of dried and sliced fronds, . .	1 part.
Water, ...	10 parts.

Macerate for four hours with occasional stirring, then heat gradually to boiling, which continue until its viscosity is discharged.

By evaporation it can be reduced to the consistence of an extract or so dried as to yield a horny translucent mass, in either of which conditions, however, it has not the emulsifying power of an equivalent of fresh decoction. The following is the writer's formula:

Cod Liver Oil Emulsion.

Take of cod liver oil, ...	10 parts.
Glycerin, ...	1 part.
Cold decoction of Lam. sacch., . . .	9 parts.

Put into a bottle of suitable size and mix by agitation. To the liquid may be added some small proportion of essential oil, for which purpose the writer is accustomed to employ oil of eucalyptus. This emulsion has been subjected to some crucial tests and is found to keep well; also it may be said that by those who have taken it, it is deemed "nice" in flavor rather than disagreeable. It obviously presents the oil in a condition easy of amalgamation with the contained food in the stomach and thus may doubtless favor its more ready digestion and ultimate assimilation.

Tne only medical opinion as yet obtained is from Dr. Slade King, of this town, who was, at my instance, the first to employ it and who reports favorably of its properties.

It may be added that it is now undergoing trial in hospital at the hands of Professor Fraser, so that probably some exact information respecting its therapeutic value will soon be forthcoming.

The writer had purposed including the results of some comparative experiments made with various antifermentatives in decoction of *Lam. saccharina*, but the length he has already trespassed forbids him more than stating that at present, after six weeks' trial, the only perfectly successful results have attended the use of—

Salicylic acid, ...	$\frac{1}{2}$ gr. to ℥i.
Cinnamic acid, ...	$\frac{1}{2}$ gr. to ℥i.
Chloroform, ...	2 drops to ℥i.
Glycerin, with	5 per cent.
Oil of eucalyptus, ...	$\frac{1}{2}$ per cent.

whilst failure followed the use of boracic acid 2 gr. to ℥i, glycerinum boracis 15♏. to ℥i, glycerin $\frac{1}{2}$ dm. to ℥i, borax 2 gr. to ℥i, oil of eucalyptus 2 drops to ℥i, lupulin 2 grs. to ℥i.

It will be sufficiently obvious that carefully selected living plants, after proper drying, are alone fitted for the preparation of these formulæ.

In conclusion, the writer would express his deep obligation to Mr. Holmes for the interest shown and kindness received from him in matters relevant to this paper.—*Ilfracombe, Phar. Jour. and Trans.*, Feb. 4, 1882.

SYRUPUS FERRI PROTOCHLORIDI.

Editor Amer. Journal of Pharmacy:

The fact of sugar reducing the ferric to ferrous chloride in the rays of the sun induced me to prepare a syrup of protochloride of iron, which in every respect is superior and preferable to the tincture of chloride of iron and which, if adopted into the U. S. Pharmacopœia, will no doubt in most cases take the place of the tincture, being agreeable to taste, not corroding or blackening teeth, and more easily assimilated by the blood.

The following is the formula adopted by me:

℞	Liq. ferri perchloridi, U. S. P., . . .		f℥v$\frac{1}{3}$ ♏xx
	Glycerini, ...		℥iv
	Syr. simpl., q. s. ad		Oi
	Olei rosæ, olei neroli, ...	*aa*	gtti

Mix and expose to the sun until entirely colorless.

Three or four days will be sufficient in summer, six to eight in very cold weather, the coldest weather not being an impediment for the reduction, which can be promoted by heating the syrup near the stove before exposing it to the sun.

In iron strength 1 fluidrachm of this syrup is equal to 10 minims of tinctura ferri chloridi.

This syrup has become quite a favorite with several physicians in this place, being especially suitable for children, and I think it deserves to be regarded as one of the most agreeable and active iron preparations. It can be mixed without change of color or decomposition with elixir of calisaya bark, tincture gentian, the syrup and elixir of hypophosphites, solution of bromides, etc.

In diffused daylight it will acquire a brownish color without changing its qualities; a separation of grape sugar has not been noticed, on keeping.

ALFRED FRÜH.

Greenville, N. J., Feb. 9.

NOTE.—Syrup of ferrous chloride is made in France by dissolving 5 grams of dry ferrous chloride in 20 grams of orange flower water and adding 800 grams of simple syrup and 175 grams of syrup of orange flower. See this journal, 1877, p. 349. EDITOR.

POISONING WITH OIL OF RANUNCULUS, ANEMONIN AND CARDOL.

BY ALFRED BASINER.

From a pamphlet, entitled: Die Vergiftung mit Ranunkelöl, Anemonin und Cardol in Beziehung zu der Cantharidin Vergiftung. Dorpat, 1881.

Experiments made with the fresh herb of Ranunculus sceleratus yielded the oil as a light yellow neutral liquid on agitating the aqueous distillate with ether and evaporating the solvent. The results obtained by the author are summarized as follows:

1. Oil of ranunculus may be separated from the aqueous distillate, acidulated with acetic acid by agitation with ether or benzol; the oil cannot be obtained after the aqueous distillate has been rendered alkaline by potassa.

2. The oil may likewise be obtained by treating the fresh plant with glacial acetic acid and agitating with benzol. Thus prepared it is not chemically pure, but has the advantage of remaining unaltered for a longer time than the distilled oil, which is readily converted into anemonin and anemonic acid.

3. If the fresh herb is treated with potassa instead of with acetic acid, the oil is decomposed.

4. The oil of ranunculus cannot, therefore, be isolated by Radecki's method for cantharidin (treatment with potassa, etc.), and cannot be mistaken for the latter.

5. In warm-blooded animals the oil of ranunculus acts as an acrid narcotic, producing, in small doses, stupor and slow respiration, in larger doses also paralysis of the posterior and anterior extremities, and before death convulsions of the entire body. The acrid action is shown by a corrosive gastritis and by hyperæmia of the kidneys, more particularly in the cortical substance. The presence of the oil in the vomited matter could be proven by extraction with glacial acetic acid and agitation with benzol. The examination of the urine and various organs of the poisoned animal, which was performed once, had a negative result.

From the experiments with anemonin the following results were obtained:

1. The rubefacient action of anemonin is very variable, not only in different individuals, but applied on the same person it may produce

redness of the skin, with subsequent vesication, at another time merely redden the skin, or be without any effect.

2. Anemonin may be isolated from acid solutions by agitation with benzol, but not from an alkaline solution.

3. Therefore anemonin cannot, by Radecki's process, be mistaken for cantharidin.

4. Notwithstanding its insolubility in water, anemonin is absorbed from the stomach as well as from the subcuticular tissue; it acts as a narcotic, lessening the respiration and, according to Clarus, also the pulse, and producing stupor, coma and paralysis of the extremities. Death is produced without convulsions, probably by paralysis of the heart and lungs. It has no irritating action upon the stomach, intestines and kidneys. The autopsy shows congestion of the right heart and large veins, and, according to Clarus, the membranes of the brain are hyperæmic.

5. After poisoning by anemonin, the presence of this compound is best proven in the contents of the stomach, in the small intestines, and particularly in the urine. The chemical reactions of this poison are uncertain, and may be supplemented by the physiological action on small frogs, but even this is of limited importance.

6. The excretion of anemonin, like that of cantharidin, appears to take place mainly through the kidneys.

For the experiments with cardol the etherial extracts of the pericarp of both the West Indian and East Indian cashew nuts were applied. 0·09 gram of the former applied to the breast upon a piece of lint 1 centimeter square in 14 hours raised a blister, with watery contents, changing within a day to a pus-like liquid, and healing after forming a scab. 0·11 gram of the brown-black oil of the oriental cashew nut applied as before raised within 12 hours a black blister; on the following day eczematous vesicles appeared on the breast and extended during the following four days gradually to the armpit, abdomen, penis, face, hands and forearm. The treatment consisted in evacuating the bowels, applications of lead-water to the eyes and of carbolic oil to the eruption; chloral hydrate and morphine were given. On the sixth day scabs began to form on the breast and forehead; micturition painful, urine red-brown: stools bloody, very painful. On the eighth day micturition and stools painless. On the ninth day, September 6, scabs began to form in the face. The desquamation of all affected parts was

completed September 16, with the exception of the hands, which required another week.

On searching for a chemical reaction of cardol it was observed that the brown oil of oriental cashew nuts produced with aqueous and more intensely with alcoholic solution of potassa a green color, and that the alcoholic solution turned black with basic acetate of lead. The brown oil from the West Indian cashew nut dissolves in potassa with a pale red color, which gradually becomes darker on exposure to the air; alcoholic potassa yields a yellowish-red color, darkening on exposure; after boiling and pouring the liquid in a watch crystal, a violet red color is observed, gradually turning more red; the alcoholic solution of this cardol yields with basic lead acetate a pale red precipitate, gradually becoming darker; acetate of copper yields a grass-green precipitate. Anemonin shows a very similar behavior to that described for cardol by boiling with alcoholic potassa, but it has none of the other reactions.

The results of the author with cardol are summarized as follows:

1. Cardol from West Indian cashew-nuts differs chemically from that of oriental cashew-nuts; the action of the latter, on being applied to the skin, seems to be more extended and more intense.

2. Cardol may be separated from mixtures by extraction with glacial acetic acid and subsequent agitation with benzol.

3. Cardol is decomposed by potassa, and cannot therefore be isolated by Radecki's method for cantharidin.

4. On subcutaneous injection of small doses, cardol produces in cold-blooded animals paresis, increasing to paralysis, of the extremities, stupor, paralysis of respiration, and previous to death tetanic spasms.

5. Large doses of cardol, swallowed by warm-blooded animals, have no lethal effect; but a resorption takes place evincing its chief action upon the spine and brain, producing stupor and paralysis of the extremities, also a violent diarrhœa. On dissection an intense inflammation is observed, combined with hemorrhages of the mucous membrane of the small and large intestines; also a slight hyperæmia of the kidneys.

6. The excretion of cardol appears to take place to a small extent through the feces, and mostly through the urine, in which the presence of the poison is best established. The chemical reactions may be supplemented by the physiological effects on small frogs.

Comparing the results obtained with oil of ranunculus, anemonin and cardol, the following may be deduced:

1. The three bodies may be isolated by extraction with glacial acetic acid and agitating with benzol.

2. Although cantharidin may be isolated in the same manner, it cannot be confounded with the former three bodies, since it may likewise be obtained by means of caustic potassa, which decomposes the other three bodies.

3. Oil of ranunculus and cardol are powerful and sure vesicants, while the vesicating action of anemonin is uncertain.

4. Anemonin taken internally acts as a narcotic, the other two as acrid narcotics; the narcotic action is directed upon brain and spine. The corrosive action of oil of ranunculus takes place in the stomach, but that of cardol in the lower part of the small and in the large intestines.

The author has also examined the tincture and herb of *arnica* for the presence of a vesicating principle, which Wilms (1873) stated to exist therein; but he was unable to obtain such a principle, and his results were verified by experiments performed by Kessler.

GLEANINGS IN MATERIA MEDICA.

BY THE EDITOR.

Digitalis Leaves.—Some authorities require an infusion of digitalis in the proportion of 1:100 to yield at once a strong turbidity with tannin, and after 15 minutes a turbidity with ferridcyanide of potassium. However collected in mountainous regions during the flowering period the leaves gave only slight reactions, but responded promptly to those reagents in infusions of the strength 1:10.—*Pharm. Ztg.*, 1881, No. 99; *Ph. Tidskr.*, Nov. 21.

Adulteration of Saffron.—C. Bernbeck reports having met with saffron adulterated with carthamus, and in another case an adulteration with the petals of red poppy which had evidently been cut into pieces of a uniform shape by means of a special apparatus; the infusion turned gray-green with ammonia, and became of a brighter red with nitric acid. The behavior in the spectroscope was the more characteristic, the left side of the scale being completely extinguished with gradual dimunition to D, red and orange being but slightly absorbed.—*Pharm. Ztg.*, 1881, No. 98.

Adulterated Manna was observed by A. Jandous; a common manna gerace was mixed with fragments of white grape sugar, whereby the appearance of the soft sticky mass was improved. The adulteration was made plainly evident only after crushing the manna.—*Pharm. Post*, 1881, No. 24.

New Drugs from the Argentine Republic. The following are mentioned by Gehe & Co.:

Cestrum pseudoguina, Mart., durazuillo, nat. ord. Solanaceæ. The leaves and rootbark are employed in fevers and abdominal complaints.

Nierembergia oippomanica, Mart., chucu, nat. ord. Solanaceæ. Horses feeding on it are attacked by fever and rigor, called "chucu."

Xanthoxylum Coco, Gill., Rutaceæ; used against chucu.

Gourliea Decorticans, Gill., chanar, Leguminosæ; the inspissated juice of the fruit is used in pectoral complaints; the bark in difficult after-birth.

Zizyphus Mistol, Griseb., Rhamnaceæ; the fruit is diuretic.

Condalia lineata, Griseb., piquillin, Rhamnaceæ; the inspissated juice is laxative; chiefly used for children.

Celtis Tala, Gill., Urticaciæ; an infusion of the leaves is used in pectoral catarrhs.

Martinia montevidensis, Cham., Gesneraceæ; the seeds are used in diseases of the eye.

Prosopis Tintitaco, Leguminosæ; the fruit is diuretic.

Colletia ferox, Gill., s. Barba tigris, Rhamnaceæ; the wood is very hard and indestructible, even in water.

Topas aire, Compositæ; botanical name not known; used in ophthalmic complaints.

Nio, probably identical with *mio-mio* from Baccharis cordifolia *Lam.*, Compositæ; the herb is a deadly poison to cattle and, according to P. N. Arata, contains an alkaloid, *baccarine.—Zeitschr. Oest. Apoth. Ver.*, 1881, No. 27.

Jacaranda procera, Sprengel, s. Bignonia Copaia, *Aubl.*, s. Kordelestris syphilitica *Arruel* s. Bignonia Càroba, *Vellos.* This handsome little tree is known in Brazil as caroba, carobinha, caroba miuda, and caroba mirim, and grows frequently in the provinces of Rio de Janeiro, Minas and Espirito Santo. Th. Peckolt has examined both the leaves and bark with the following results, obtained from 1,000 grams:

	Leaves.	Bark.
Carobin, crystallized,	1·620	3·000
Carobic acid, crystallized,	·516	....
Steocarobic acid, crystallized,	1·000	....
Carobone, balsamic resinous acid,	26·666	....
Carobaretic acid, inodorous,	....	2·000
Carobaresin, inodorous, tasteless,	33·334	5·000
Caroba balsam,	14·420	....
Bitter principle,	2·880	2·830
Extractive,	10·550	19·530
Extractive and organic acids,	10·000	....
Caroba tannin,	4·390	4·800
Glucose,	....	1·650
Chlorophyll and wax,	9·000	....
Calcium malate,	·200	76·100
Albumen, starch, dextrin, salts,	32·120	
Cellulose and moisture,	853·304	885·090

Carobin crystallizes in feltlike silky needles, is inodorous, has a faint alkaline and bitterish taste, infusible, insoluble in ether, readily soluble in boiling water and boiling alcohol and is precipitated by tartar emetic and ammonium carbonate, the latter precipitate being soluble in an excess of the reagent. Tannin and metallic chlorides and iodides cause no precipitate. It is not a glucoside, does not show any striking color reactions and yields with acetic acid a compound crystallizing in fine needles.

Carobic acid forms stellate fusible needles of an aromatic odor and acid taste, is soluble in water and dilute alcohol and is precipitated by the acetates of lead and copper.

Steocarobic acid is pale-brown, of a tonka-like odor, of an acid and balsamic taste, and soluble in cold absolute alcohol and ether.

Carobone is greenish, amorphous, aromatic, soluble in alcohol, sp. gr. ·815, in caustic alkalies and in boiling solution of sodium carbonate.

Caroba balsam is dark-brown, syrupy, agreeably aromatic, resembling tonka and by heat may be evaporated to a nearly inodorous resin.

Caroba leaves have lanceolate, often sub-obovate leaflets and are used in Brazil in place of sarsaparilla, in cutaneous affections and as an antisyphilitic, usually in the form of infusion, 120 grams to 1 liter, in doses of a teaspoonful three times daily. An *electuary* known as "massa de Dr. Alves Carneiro" is composed of the powders of caroba leaves 90 grams, sarsaparilla and senna each 30 grams, calomel 2 grams and simple syrup q. s., and is given in cuta-

neous syphilitic affections in doses of a teaspoonful morning and evening, together with caroba tea.

The above analysis was completed in 1866; a manuscript in French sent to the Paris exposition was never published; but a catalogue was published by the author in Ria in the Portuguese language in 1868. An analysis credited to C.W. Zaremba in "Phar. Centralhalle" June 23, 1881, gives figures identical with the above.

The following plants are also known in Brazil as caroba:

Jacaranda subrhombea, D. C., s. Bignonia obovata, *Vellos.*, caroba preta or carob-assú; a furrowed crisp dark-green leaf, not aromatic, apparently less efficacious.

Bignonia nodosa, Manso, caroba do campo, slightly aromatic, grows in the prairies, esteemed to be equal to true caroba.

Jacaranda oxyphylla, Cham., s. Big. antisyphilitica, *Martius*, caroba des paulistas; leaflets dark-green, nearly inodorous, reputed to be also laxative; grows in the province of San Paulo.

Bignonia purgans, caroba guyra, in Amazonas; leaves used as an antisyphilitic, the root-bark as a purgative.

Sparattosperma lithontripticum, Mart., caroba branca; leaves light-green, mealy, aromatic, acrid and bitter; diuretic.

Cybistax antisyphilitica, Mart., s. Big. quinquefolia, *Vellos.;* used in dysury, dropsy, chronic liver complaints, syphilitic ulcers, etc.—*Zeitschr. Oest. Apoth. Ver.*, 1881, No. 30, 31.

Volatile Oil of Likari Kanali, or Female Rosewood—H. Morin gives a brief description of this volatile oil, recently imported from French Guiana, and known in commerce as "essence de linaloes." While this product is obtained from the above-mentioned source, or the so-called white cedar tree (cedre blanc de Cayenne), and is assigned to an *Acrodiclidium* of the natural order Lauraceæ; the linaloes wood of Mexico, which also yields a very fragrant volatile oil, is obtained, according to Collins,[1] from *Elaphrium graveolens*, Kunth, natural order Burseraceæ. The first-mentioned oil is nearly colorless, lighter than water, and has an agreeable aromatic odor, resembling that of roses and lemons; it burns with a sooty flame, does not solidify at 20°C., but becomes thereby turbid from the presence of a small amount of water, and deposits fine needle-shaped crystals. When deprived of water by means of chloride of calcium, it distils almost entirely at a constant

[1] Flükiger. "Pharmakognosie des Pflanzenreiches," II Auflage, p. 196.

temperature, and forms then a perfectly colorless liquid of the sp. gr. 0·868, which boils at 198°C., rotates 19° to the left, and is soluble in alcohol, ether, and glycerin. Caustic potassa has no action upon the oil; bromine, iodine, and nitric acid, however, produce a violent reaction, accompanied in the first instance with the evolution of vapors of hydrobromic acid. Hydrochloric acid gas is absorbed by the oil, forming a liquid compound with a comphoraceous odor; concentrated sulphuric acid mixes with it with the development of heat, and produces a brown, smeary mass. Its elementary composition corresponds to the formula of Borneo camphor, $C_{10}H_{18}O$; by treatment with chloride of zinc it yields a neutral, viscid hydrocarbon, having the odor of turpentine and the composition $C_{10}H_{16}$.—*Jour. der Pharm. et de Chim.*, July, 1881, p. 66.

VARIETIES.

Effect of Drugs on Lactation.—The practical conclusions of Dolan and Wood, in "Practitioner," are: 1. Therapeutical agents intended to act on the mammary gland must first enter the blood. 2. Drugs derived from the natural orders Liliaceæ, Cruciferæ, Solanaceæ, Umbelliferæ, etc., enter the blood and impregnate the milk, hence caution is needed in giving such drugs to nursing women. 3. The only approach to a true galactagogue is jaborandi. 4. Belladonna is an antigalactagogue. 5. In inaction of the mammæ the milk may be increased and influenced by medicines. 6. The milk may be increased in heat-forming elements by administration of fats. 7. The salts of milk are improved by administration of medicines. 8. Various physiological actions—purgative, alterative, diuretic, etc.,—are produced in the child by giving drugs to the mother. 9. We must look to diet for improvement in milk-secreting power, both as to the quantity and quality of the milk.—*Louisville Medical News.*

A New Purgative.—The "Concours Médical" reports that Dr. Rabuteau has experimented with sulpho-phenate and sulpho-cresylate of sodium, and has obtained excellent purgative effects with both. A dose of from 20 to 25 grams (ʒv to vj, gr. xv) will induce seven or eight stools in the course of a day. Those salts are eliminated, almost totaliy, without any change, and their use is advised in cases of fetid diarrhœa.—*Med. and Surg. Rep.*, February 11.

Cottonseed and Olive Oil Mixtures.—G. A. Buchheister procured a sample of pure cotton oil to experiment upon. The result of investigation was, after finding that the ordinary tests, sulphuric and nitric acids, potash-lye, ammonia, etc., produced no characteristic reactions, a simple

process by which an addition of 10 per cent. is visible, and one of 20 per cent. quite distinct (smaller proportions are not often used), if comparative tests are made on pure olive oil. He operated in a somewhat similar manner, according to Boudet's principle, with a mixture of equal parts of sulphuric and nitric acids. If three parts of this mixture, after being allowed to cool, are added to ten parts of the oil, and the whole is well shaken together, pure olive oil has a white color with a greenish cast, oil of sesame a grass green, and cotton oil a paler color. After a few minutes the liquids separate, and pure olive oil appears almost unchanged, cotton oil a light brown, and rape oil a lighter and more reddish brown. If a sample of oil therefore turns brown with the above test, we have either cotton oil or a cruciferous oil (rape or colza). The presence of the latter may then be easily ascertained by means of oxide of lead, which they blacken.—*Droguisten Zeitung; Oil and Drug News.*

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, Feb. 21st, 1882.

In absence of the President, Mr. A. Robbins was called to the chair. The minutes of the last pharmaceutical meeting were read and approved.

The introduction of strangers being the first business, Mr. Louis Dohme, of the Maryland College of Pharmacy, who was present, was invited to participate in the meeting.

Prof. Sadtler exhibited and operated with the new *electrical apparatus* presented by our fellow member and graduate, Mr. F. Gutekunst, with *Geissler tubes* of various patterns, which gave illustrations of extreme beauty. A vote of thanks of the College was tendered to the donor for the great interest he has shown in furthering the educational advantages of the College.

Prof. Remington exhibited a piece of apparatus combining a *plaster-spreading apparatus* with graduated plates for making plasters of any definite size, and arranged so that it could be used as a *lozenge board*, and, by the addition of a grooved plate, as a *pill machine*. An illustrated description of the apparatus will appear in the April number of this journal. The apparatus was designed by Mr. W. C. Franciscus, of the present junior class.

A note upon *hypophosphorous acid*, by G. M. Beringer, Ph.G. (see page 100), was read by Prof. Maisch, and referred to the Publishing Committee. Prof. Maisch said that he believed the hypophosphites of the alkalies to have an alkaline reaction, and that neutralization was not the most exact method of estimating the acid. Prof. Power stated that an exact method consisted in oxidizing by potassium permanganate. Mr. Bullock preferred neutralization with a carbonate as the most suitable process for the pharmacist.

A formula for *mistura apii composita* was read by Prof. Maisch, who received it upon inquiry from Dr. W. A. Hammond, by whom an extem-

poraneous prescription, consisting of two parts fluid extract of coca, one part fluid extract of viburnum, and one part of fluid extract of Apium graveolens, is thus designated for convenience. The mixture is an excellent nerve sedative and tonic, and is given in doses of from one to two teaspoonfuls three times a day.

Inquiry was made respecting *fluoride of sodium* and *fluoride of potassium*, which have been recommended in boulimia—a morbid desire for food—without giving the dose. Dr. L. Wolff stated that he had prepared the salts by neutralizing hydrofluoric acid with the carbonate of either base desired; the process should be conducted either in lead or platinum vessels.

A paper upon the *solubility of sulphate of morphia* was read by Professor Power, and was referred to the Publishing Committee (see page 97). This paper elicited some comment, several members present stating that they had noticed a difference in the solubility of the salt as obtained from different manufacturers.

Prof. Power also exhibited a *Geissler's vaporimeter*, which is an apparatus for testing the alcoholic strength of various liquids, and is operated by the pressure of alcoholic vapor, at the temperature of the water-bath, upon mercury which is thereby forced into a capillary tube connected with a graduated scale from which the percentage by volume and by weight is read off. Experimenting with *Hercules Malt Wine*, after depriving it of carbonic acid by lime, the vaporimeter showed it to contain 7·39 per cent. by volume, or 5·86 per cent. by weight, of alcohol. This malt wine is a deep red-brown beer-like liquid, resembling in some respects certain commercial so-called extracts of malt, but differing greatly from the unfermented *extractum malti* of the German Pharmacopœia, and prepared by pharmacists.

There being no further business, on motion, the meeting adjourned.

T. S. Wiegand, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Connecticut Pharmaceutical Association. — The sixth annual meeting was held in St. George's Hall, Bridgeport, on Feb. 7th and 8th, President L. I. Munson in the chair. Reports were read from the various officers and committees, the Treasurer reporting a balance on hand of $746.29, and the Committee on Legislation stating that some amendments to the pharmacy law are under consideration. The President, in his annual address, gave an account of the operations of the association through its officers during the past year, and made several suggestions which were acted upon.

An invitation from Mr. P. T. Barnum to visit the winter quarters of his menagerie and see the baby elephant was received and accepted.

The election of officers resulted as follows, Mr. Munson declining to serve a second term: President, Dwight Phelps, of West Winsted; Vice

Presidents, N. D. Sevin, of Norwich, and Walter R. Francis, of New Haven; Secretary, Frederic Wilcox, of Waterbury; Treasurer, George P. Chandler, of Hartford.

After several amendments to the constitution and by-laws had been acted upon, the historian of the association, Mr. Julius G. Rathbun, of Hartford, read his report, which was full of wit and humor. The gentleman was reappointed to the position for another year.

During the meeting eight papers on spirit of nitre, officinal fluid extracts, tinctures, glucose in sugar, tincture of opium, compound tincture of cardamom, soluble extract of licorice and on standard formulas for unofficinal preparations were read, a number of committees were appointed, and after passing votes of thanks the association adjourned to meet next year in Hartford, Mr. E. C. Frisbie being chosen Local Secretary.

A very creditable exhibit of drugs, preparations, glassware and sundries was made by 8 or 10 firms.

Massachusetts College of Pharmacy. — At the pharmaceutical meeting held Jan. 10, Mr. F. A. Davidson read a paper on *stearin and stearic acid*, by-products from the manufacture of lard oil and glycerin, which are at present mainly used in the manufacture of soap and a few mechanical applications, and which may serve the purpose of a cheap and useful base for ointments, especially those dispensed for veterinary use.

Allusion was made to the use of fresh sweet lard made from the "leaves," to the emollient properties of mutton tallow in domestic use, and to the fact that paraffin products are not as readily absorbed by the skin as fats.

Mr. G. F. Dinsmore exhibited a *plaster machine*, for spreading plasters of any desired size.

Attention was also directed to the recent extensive and valuable additions to the College library.

The Ontario College of Pharmaycy has had under consideration for some time the expediency of establishing a teaching college, the subject having been referred to a committee, which reported to the Council on Feb. 2d, recommending the appointment of a permanent Educational Committee and of a staff of lecturers. The recommendations were adopted, a sum of money was appropriated to defray the necessary expenses, and the following teachers were appointed: E. B. Shuttleworth, Professor of Chemistry and Pharmacy; H. J. Rose, Professor of Materia Medica, and W. S. Robinson, Demonstrator in Practical Dispensing and Prescriptions. The chair of botany has not yet been filled.

With commendable promptness, a course of lectures will be delivered during the spring.

California Pharmaceutical Society.—The regular quarterly meeting was held Jan. 12th, in the Academy of Science building. The trustees reported that during the past year 47 students had matriculated, and

that out of 14 candidates for the degree of Graduate in Pharmacy the following 13 passed: J. J. Argente, A. L. Scholl, D. Lustig, M. J. Murphy, W. H. Adair, C. P. Elwert, C. M. Troppman, H. Cody, D. Fletcher, Chas. Hammit, J. M. Dewitt, J. P. Fevrier and Geo. Chard.

Prof. Emlen Painter, the President, in his annual address related the purchase of a lot by the Board of Trustees, situated on Fulton street, west of Polk, size 30 by 97 feet, at a cost of $2,700. The address also recommended the immediate establishment of a building fund for the permanent improvement of the ground and the accommodation of the College.

The report by the Treasurer, Wm. J. Bryan, showed a balance in hand of $1,434.56

The several other officers handed in their reports; there are now 85 active members on the roll.

Mr. John Calvert gave notice that he would offer a resolution at the next meeting that the funds of the California Pharmaceutical Society and the College of Pharmacy be consolidated.

The following officers were elected for the ensuing year: President, Emlen Painter; Vice Presidents—Wm. M. Searby, James Topley; Corresponding and Recording Secretary, Fred. Grazer; Treasurer, Wm. J. Bryan; Librarian and Curator, Ph. L. Vreeland; Editor, William M. Searby; Board of Trustees—Emlen Painter, John Calvert, John Dawson, D. W. Kirkland, S. A. McDonnell, Fred. Keil, F. A. Grazer.

Mr. S. A. McDonnell read a very interesting paper on quillain, or Extractum Quillaiæ Exsiccatum, its uses, and advantages for preparing instantaneously emulsions of fixed oils, etc.

Pharmaceutical Society of Great Britain.—At the Pharmaceutical meeting held December 7th, Mr. J. B. Barnes read a paper on *the antiseptic properties of cinnamic acid.* The solubility of cinnamic acid is given as follows: lard 3·0 per cent., cacao butter 0·5, expressed oil of almond 1·0, codliver oil 2·0, white wax 3·0, paraffin 0·5, oleic acid 5·0, benzol 1·0, ether 20·0, chloroform 8·0, glycerite of borax 1·5 and water $\frac{1}{10}$ per cent., one part of the acid dissolves in olive oil 66 parts, vaselin 40 parts, spermaceti 66 parts, 2 per cent. watery solution of sodium phosphate 50 parts, 2 per cent. borax solution 25 parts and in glycerin 400 parts.

Two grains of cinnamic acid were added to 4 fluidounces of the following liquids with the results indicated: Albumen solution, became putrid on the eighteenth day; gelatin solution, putrid on the fifteenth day; urine, cloudy on the twenty-ninth and putrid on the thirty-first day; decoction of malt, fermentation retarded; cold infusion of malt broke down on the thirty-sixth day; infusion of roses unchanged after sixty days. The experiments were made at 60°F. Four grains of cinnamic acid preserved the liquids for a longer period.

In the discussion on this paper, Mr. Ekin said that in some experiments made by him on *milk* some years ago, he had found *boracic acid* to be decidedly superior to salicylic or benzoic acid, that it was harmless and tasteless, and that he believed it was now used by hundredweights in the north of England for the preservation of milk.

Mr. Symes had not been encouraged with the use of cinnamic acid prepared from tolu balsam as an antiseptic agent, and agreed with the views expressed by Prof. Attfield, that each of the different antiseptics would probably be found to be best adapted for one class of substances, instead of for all.

In experimenting with *juice of meat*, Mr. Gerrard had found *chloroform* to be the best antiseptic, while the preparation containing boracic acid was the first one to break down. Meat juice containing ¼ per cent. of chloroform was still intact after three months.

A paper by Mr. W. A. H. Naylor was read, giving the results of the proximate analysis of *the fruit of Omphalocarpum procera*, which was found to contain 1, a congener of gutta; 2, a resin allied to fluavil; 3, a glucoside analogous to saponin, but approaching more nearly to monesin; 4, a vegetable wax; 5, a neutral crystalline principle, omphalocarpin, soluble in alcohol, less soluble in water, and very slightly soluble in chlorform and ether; gives with warm sulphuric acid a rich purplish-crimson color; 6, a bitter and coloring principle, resembling cinchona red in appearance, and insoluble in chloroform, ether and water; 7, glucose; 8, an organic acid; 9, a fixed oil; 10, gummy and albuminous matter and 2·5 per cent. of ash. The plant had been placed by some botanists in the order of Ternstrœmiaceæ, by others with the Sapotaceæ; the evidence from the chemical properties clearly preponderates in favor of the latter.

At the meeting of the North British Branch, held December 1st, Mr. Wm. Gilmour read a paper on *the formation of cream of tartar in Seidlitz powder*, showing that acid potassium tartrate is formed in larger quantity than the excess of tartaric acid would theoretically indicate, and that this is due to the influence of carbonic acid. Using 120 grains of Rochelle salt, 40 grains of sodium bicarbonate and 40 grains of tartaric acid, or of the latter an excess of 4½ grains, not 6, but 15 grains of cream of tartar were precipitated; using 45 grains of acid or 9½ grains in excess, the precipitate weighed 30 grains. On putting the ingredients of the Seidlitz powder into a soda-water bottle with 6 ounces of water and with 30 grains of tartaric acid, that is 5½ grains below the neutralizing quantity, a copious precipitate will be formed, which will not be redissolved with frequent agitation for several hours.

Gregory's Powder, Pulv. rhei comp., had been experimented with by Mr. Gilmour, who observed that magnesium carbonate, when mixed with calcined magnesia, did not make a miscible Gregory's powder, but that if the rhubarb and ginger were first thoroughly triturated with about 5 per cent. of the carbonate, and the calcined magnesia afterwards added, there resulted a beautiful and quickly miscible powder.

Mr. Nesbit had found in powdered rhubarb 4 per cent. of an oil of sp. gr. ·91 which had been used for facing the rhubarb, and greatly affected its miscibility with water.

A series of experiments were detailed by Dr. Inglis Clark, from which it was concluded 1, that the non-miscibility is promoted as the exposure to moisture increases; 2, that it is best to have freshly ignited magnesia, and to keep it in a dry place; 3, that it is better to have a damp magnesia to

begin with than to allow it to hydrate as pulv. rhei comp.; 4, that the hydration of the magnesia is the principal cause of the non-miscibility; and 5, that rhubarbs are important factors in producing non-miscibility, but less so than magnesia.

Mr. Mackenzie directed attention to the well-known fact, which is however frequently overlooked, that such powders are easily mixed with a very small quantity of water, after which the remainder of the water may be added. The addition of a small proportion of ponderous carbonate of magnesium had been found very advantageous.

Mr. Gilmour also spoke of *syrup of protochloride of iron* recently introduced in Edinburgh; it contains 2 grains of the salt to the drachm (see also page 129).

At the Pharmaceutical meeting held February 1, a valuable collection of specimens of the materia medica of Madagascar was presented by Dr. Parker, physician to the queen of that island, and was commented upon by Mr. Holmes, Dr. Parker and Mr. Baker, of the Royal Herbarium, Kew. Many of the specimens were from species hitherto unknown, and a number of them appear to be deserving of further investigation.

A paper was read by M. Mitchell Bird on *the amount of iodine present in codliver oil.* 5,000 grains of oil were saponified with alcoholic solution of potassa, the soap was incinerated in a crucible, the residue exhausted with water, the filtrate concentrated, then acidulated with sulphuric acid, filtered from the potassium sulphate and the liquid mixed with a few drops of potassium nitrite and an excess of starch liquor. These mixtures were compared with solutions of potassium iodide of known strength, treated with the reagents indicated. It was ascertained that 10,000 parts of the oil contained the following amounts of iodine calculated as potassium iodide: pale Norwegian oil ·21 and ·18, light brown Norwegian ·16, pale Newfoundland ·12, light brown Newfoundland ·14 parts. The amount of iodine yielded was in inverse proportion to their sensitiveness to cold. While all samples contained iodine, its amount was not at all approaching ·05 per cent., as has been stated by some authors.

A paper on *iodine-yielding algæ*, by James Wheeler, was also read (see page 124).

EDITORIAL DEPARTMENT.

Legislation in West Virginia.—The objectionable bill before the Legislature of West Virginia, which in some of its provisions was strenuously objected to by the Pharmaceutical Association of that State (see p. 92 of February number), was defeated in the Senate on Feb. 20, it being indefinitely postponed by a vote of 16 to 6.

Rapid Preparation of Mercurial Ointment.—An old druggist of Philadelphia writes that the solution of this question is a small quantity of spermaceti rubbed up in a warm mortar with mercury, when the globules of the latter will disappear in less than five minutes.

OBITUARY.

George Parker Kettell died at Charlestown, Boston, Nov. 13, 1881, where he had been in business for nearly forty years. He was a member of the Massachusetts College of Pharmay, and of the American Pharmaceutical Association.

Prof. Robert Bridges, M.D., died in Philadelphia Feb. 20, aged 76 years. A full biographical sketch of the deceased, who from 1839 to 1845 acted as associate editor, and from 1846 to 1861 as a member of the Publishing Committee of this journal, will doubtless be prepared by the proper committee of the Philadelphia College of Pharmacy, with which institution the deceased was connected for nearly fifty years. The following was adopted at a special meeting of the Board of Trustees, held Feb. 21st:

Whereas, Robert Bridges, M.D., who held the Chair of Chemistry in this College for thirty-seven years, deceased on the 20th inst., the Board of Trustees of the College desire to place on record their appreciation of the character of the deceased; therefore,

Resolved, That this Board express their high regard for the conscientious fidelity and undeviating integrity with which he discharged his duties as a professor.

With an unselfish disposition, he regarded the duties of a teacher as superior to personal advancement, and the even tenor of his course is marked by real work accomplished.

Resolved, That in the death of Dr. Bridges this College has lost a member who for nearly half a century has taken a lively interest in its affairs, and the Board of Trustees its chairman for many years.

Resolved, That the members of the Board, as a tribute of respect to the memory of their fellow-member, will attend his funeral.

Thomas P. James died at Cambridge, Mass., Feb. 22, in the seventy-ninth year of his age. He was born Sept. 1, 1803, at Radnor, Chester county, Pa., received his early education at Trenton, N. J., learned the drug business in Philadelphia, and afterwards was for many years in this city the proprietor of a wholesale drug store on Market below Eighth street. He joined the Philadelphia College of Pharmacy in 1838, served on the Publishing Committee from 1845 to 1849, and was elected to the Board of Trustees for a series of years. Botany was his favorite study, more especially the cryptogams, and he was elected Professor of Botany in 1864 by the Pennsylvania Horticultural Society, of which the deceased had been Secretary for 23 years. He had also been President of the Philadelphia Drug Exchange, Treasurer of the American Pomological Society and member of the American Philosophical Society and of the American Pharmaceutical Association. Since about the year 1869 he has been a resident of Cambridge.

THE AMERICAN
JOURNAL OF PHARMACY.

APRIL, 1882.

ON HOMATROPINE.

BY PROF. FREDERICK B. POWER, PH.D.

Read at the Pharmaceutical Meeting, March 21, 1882.

Among the many interesting problems of organic chemistry which have received the attention of chemists, that bearing upon the constitution and relations of the alkaloids of the Solanaceæ is one of the more important in its character, not alone from the results at present accomplished, but also with regard to its ultimately more extended application; and it is chiefly to the classical investigations of Ladenburg that we owe the many valuable contributions in this special department of chemical research.

Although the results of the progressive investigations of Ladenburg have from time to time been made known to the readers of the JOURNAL through the "Chemical Notes" of Prof. Sadtler (this journal, 1880, pp. 148, 198, 367, 550), it has seemed desirable that a somewhat more extended notice should be given of that derivative of atropine which has received the appellation of homatropine, and which, in the form of hydrobromate, has recently been brought more prominently to professional notice through its valuable application in ophthalmic practice.

It may thus be primarily stated that it is not the purport of this notice to record any hitherto unknown facts, but rather to briefly summarize the more important points of interest relating to the body known as homatropine and to render the substance of the literature connected therewith, which is principally distributed through the German scientific periodicals, accessible to the readers of the home journal.

As is well known, the first contribution to the constitution of atropine was furnished by Kraut and Lossen,[1] who, by the action of either

[1] "Annal. Chem. Pharm.," Bd. 138.

barium hydrate or hydrochloric acid, succeeded in decomposing it into tropine and tropic acid.

$$\underbrace{C_{17}H_{23}NO_3}_{\text{Atropine.}}+H_2O=\underbrace{C_8H_{15}NO}_{\text{Tropine.}}+\underbrace{C_9H_{10}O_3}_{\text{Tropic Acid.}}$$

The most important step in the direction of the synthesis or artificial formation of atropine was the subsequent success of Ladenburg[1] in combining these two products of decomposition, or forming tropate of tropine, and by heating with dilute hydrochloric acid at a temperature below 100°C., whereby a molecule of water is eliminated, accomplishing the inverse production of atropine. The success of this reaction led the same chemist to the expectation that other bases might be obtained in the same way, by the treatment of various tropine salts with dilute hydrochloric acid. This hope was fully realized, and in this manner an entire group of alkaloids may be formed, which, like atropine itself, are deducted from tropine, and to which the generic name of *tropeines* has been applied. The alkaloids hyoscyamine, daturine and duboisine, which Ladenburg has proved to be among themselves identical, and isomeric with atropine, are also with regard to the analogy of their products of decomposition tropeines. Of the new bases or tropeines, which may be formed by the above-mentioned reaction, the following have been prepared and more particularly described by Ladenburg:[2] *oxybenzoyltropeine*, $C_{15}H_{19}NO_3$, *paraoxybenzoyltropeine*, $C_{15}H_{19}NO_3$, *orthooxybenzoyltropeine*, or *salicyltropeine*, $C_{15}H_{19}NO_3$, *benzoyltropeine*, $C_{15}H_{19}NO_2$, *atropyltropeine*, or *anhydro-atropine*, $C_{17}H_{21}NO_2$, *phtalyltropeine*, $C_{24}H_{32}N_2O_4$, *cinnamyltropeine*, $C_{17}H_{21}NO_2$, and *oxytoluyltropeine* or *homatropeine*, $C_{16}H_{21}NO_3$. It is, however, to the description of the latter compound, or its hydrobromate, which alone has as yet found a practical application, and which seems destined to occupy a prominent place among the mydriatics of pharmacy, that attention will here be confined. The base is readily obtained by the treatment of amygdalate of tropine with hydrochloric acid, whereby the elements of water are eliminated from the molecule and homatropine, $C_{16}H_{21}NO_3$, is produced:

$$\underbrace{C_8H_{15}NO.C_8H_8O_3}_{\text{Tropine amygdalate.}}-H_2O=\underbrace{C_{16}H_{21}NO_3}_{\text{Homatropine.}}.$$

[1] "Ber. der Deutsch. Chem. Ges.," 1879, p. 941—944.

[2] *Ibid.*, 1880, p. 104—110 and p. 1081—1088.

Even after a few hours a considerable amount of the base is formed and when the action of the hydrochloric acid is continued for several days on the water-bath, a good yield of this interesting body (about 50 per cent. of the theoretical amount) is obtained. From the solution in hydrochloric acid potassium carbonate precipitates an oil which does not solidify, but which may be extracted by chloroform, and, after the removal of the latter by distillation, is again obtained in its original state. For its further purification it is dissolved in dilute hydrochloric acid, and subsequently precipitated as a gold double salt or as picrate. These two compounds may be recrystallized from hot water and thus obtained perfectly pure. From the pure gold compound the pure homatropine hydrochlorate may be obtained by means of hydrogen sulphide. From the picrate the base may be again separated by dissolving it in a large amount of hot water, so that it remains dissolved upon cooling, then adding an excess of potassium carbonate, and agitating with chloroform. This is again shaken with a solution of potassium carbonate in order to remove the last traces of the picrate, then dried over potassium carbonate, and distilled. The homatropine is thus always obtained in the form of an oil, and the attempts of Ladenburg to obtain it in a solid or crystalline form were not successful. More recently, however, Merck,[1] of Darmstadt, has succeeded in obtaining it in transparent, colorless prismatic crystals from its solution in absolute ether. The crystals, though not readily soluble in water, are nevertheless hygroscopic and very deliquescent; their melting point is between 95·5 and 98·5°C.

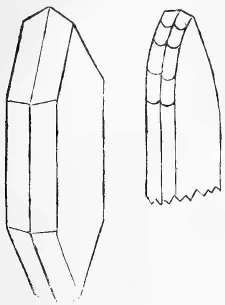
Homatropine-gold chloride, $C_{16}H_{21}NO_3.HCl.AuCl_3$, is usually precipitated as an oil, but soon crystallizes, and may be recrystallized from hot water. It is thus obtained in handsome, sparingly soluble prisms.

Homatropine-picrate, $C_{16}H_{21}NO_3.C_6H_2(NO_2)_3OH.$, is precipitated in an oily or resinous form, but soon becomes crystalline. It dissolves readily in hot water, and crystallizes therefrom in yellow, shining laminæ.

The sulphate and hydrochlorate are also crystallizable salts, and the acid solution of the latter shows the following behavior towards reagents: tannic acid gives no turbidity; potassio-mercuric iodide a white curdy precipitate; mercuric chloride a white oil, and solution of

[1] "Ber. d. Deutsch. Chem. Ges.," 1880, p. 1340.

iodine in potassium iodide yellow crystals together with a black oil. Platinic chloride produces in the concentrated solution an amorphous precipitate, and from the filtrate handsome needles are obtained on evaporation.



Crystal of Homatropine hydrobromate.

Homatropine-hydrobromate, $C_{16}H_{21}NO_3.HBr$, may be readily obtained in the crystalline form, and may therefore be directly prepared from the unpurified base. The crystalline mass thus obtained may be recrystallized from water, when the pure salt is obtained in large, wart-like aggregations of crystals.

The crystals have the form of rhombic prisms with irregularly developed pyramidal surfaces, as shown in the figure. The salt is not hygroscopic, is soluble in ten parts of water, and the solutions do not readily undergo change.

The physiological action of homatropine hydrobromate has already been briefly alluded to in this journal, 1880, p. 629, and 1881, p. 70. To recall the statement of Mr. John Tweedy and Dr. Sydney Ringer, as contained in the "Lancet," May 22, 1880, and abstracted in the "Amer. Jour. Med. Sciences," 1880, p. 267, it is a bland and efficient mydriatic, rapid in its action and of comparatively short duration. More recently the action of the salt has been made the subject of a large number of careful physiological experiments by Dr. S. D. Risley,[1] of this city, whose conclusions as to its value may be summarized in his own words:

"1. That homatropine hydrobromate in solutions of two, four and six grains to the ounce is competent to paralyze the accomodation.

"2. That in from sixteen to thirty hours this paralysis entirely disappears.

"3. That dilation of the pupil accompanies the paralysis and is more persistent, the probable duration being forty-eight hours.

"4. That it is no more liable to produce conjunctival irritation than atropine or duboisine.

"5. That it produces far less constitutional disturbance than either of the old mydriatics."

[1] "The value of homatropine hydrobromate in ophthalmic practice" in "Amer. Jour. Med. Sciences," 1881, p. 113—119.

OSMORRHIZA LONGISTYLIS, RAFINESQUE.

BY HOWARD L. GREEN, PH.G.

From an Inaugural Essay.

Synonyms—Uraspermum Claytonii, Nutt., Gen. I, p. 193; Myrrhis folii trilobatis, Gronovius Virg., p. 148.

Nat. ord., Umbelliferæ; Sub-ord., Campylospermæ.

A perennial herb indigenous to the rich, moist woods of the United States and Canada, growing as far south as Virginia, and West, as Oregon.

Stems erect, 2 to 3 feet high, of a purplish or green color, pubescent.

Leaves with long petioles, tripinnate, the divisions broadly ovate with the margins serrate or crenate, of a bright green color, slightly pubescent, especially along the midrib, the under surface shining.

Flowers white, in compound umbels of 2 to 5 rays, with an involucre of 1 to 3 narrow lanceolate leaflets.

Umbellets 3- to 5-rayed, involucels of 5 lanceolate cuspidate leaflets.

Calyx teeth obsolete.

Petals oblong nearly entire, the points incurved.

Styles slender, nearly as long as the ovary.

Fruit linear, oblong, angular, solid and attenuated at the base, somewhat obtuse at the apex, upwardly bristly, intervals without vittæ.

The underground portion consists of a rhizome 1 to 2 inches long, to which are attached a number of fusiform roots, from 3 to 12 inches in length and $\frac{1}{8}$ to $\frac{3}{8}$ inch in diameter, of a light brown color when fresh, but darkening on drying.

The roots and rhizoma possess a strong aromatic odor and taste, recalling those of anise.

It is from this it derives its name, Osmorrhiza, the word being derived from two Greek words signifying perfumed root.

The plant is commonly known as Sweet Cicely, Sweet Root, Paregoric Root, Sweet Anise.

It is among the first vegetation of spring, when it presents itself as a cluster of bright compound leaves, and develops flowers in June and July, the fruit maturing in August, after which the plant dies to the ground, and the bud for next year's growth forms and lies dormant until spring, when it again bursts forth with verdure and beauty.

The aromatic quality of the roots and rhizoma is due to the presence of a volatile oil of light brown-yellow color; the odor and taste recall those of anise, but are distinct. The oil is heavier than water, solidifies at 38°F. to a crystalline mass resembling oil of anise, with which it may be chemically identical. The yield from the fresh root is about $\frac{1}{10}$ per cent., but in the dry state the yield probably would be much larger, as the fresh root contains $68\frac{1}{2}$ per cent. of moisture. A weighed portion of the root, after drying at a temperature of 220°F., and allowed to stand in the atmosphere for a week, and again weighed, was found to have absorbed 3 per cent.

A portion of the dried root, exhausted by percolation with ether, gives a bright yellow solution, which when evaporated leaves a dark brown oleo-resinous extract, which yields about half its bulk to 95 per cent. alcohol, leaving a dirty brown fatty mass, insoluble in hot alcohol, freely soluble in cold chloroform, and more so in carbon disulphide and hot chloroform. It partly saponifies on being boiled with caustic alkalies, and on the addition of an acid to the saponified solution an insoluble fatty acid separates.

The portion taken up by alcohol, evaporated in a silver dish on a water-bath, leaves a residue consisting of two liquids of different densities, the denser liquid being of a bright yellow and the other of a dark brown color. On being shaken with water the denser liquid mixes, but does not dissolve. This aqueous mixture is not materially changed on being shaken with chloroform. On boiling the mixture it becomes clear, but on cooling the matter again deposits; on the addition of a caustic alkali the separated matter darkens in color; on the addition of an acid the color is again restored. On evaporating a portion of this mixture to dryness, in a platinum dish on a water-bath, a yellow mass, having the general characters of a resin, is left.

The darker liquid, which has a nauseous, bitter taste, is completely taken up by chloroform and carbon disulphide. It appears to be a mixture of fixed oil, a fatty substance and the essential oil of the root.

After extraction with ether, the residue exhausted with 95 per cent. alcohol gives a light yellow solution, which when evaporated to dryness, in a silver dish on a water-bath, yields a nut-brown extract, almost wholly soluble in water, the solution being somewhat cloudy, due, perhaps, to the presence of a small quantity of resinous matter.

A portion of this extract, boiled with dilute sulphuric acid, then neutralized with calcium carbonate and the calcium sulphate formed

filtered off, darkens when boiled with a caustic alkali (Moore's test), reduces bismuth subnitrate when boiled with an alkali (Boettger's test), reduces copper oxide to suboxide (Trommer's test), and also reduces silver and mercury when boiled with a caustic alkali.

This is due to the presence of a saccharoid body, which is converted into glucose or similar sugar on boiling with sulphuric acid; probably a glucoside. An aqueous solution of this extract, decolorized by animal charcoal and evaporated in a silver dish, yields a syrupy mass having the odor and taste of molasses. A portion of the extract dissolved in water and placed under the influence of yeast for about 24 hours produced evolution of gas and the odor of a fermenting liquid.

About one-tenth of this liquid having been distilled off gave a pleasant smelling distillate in which the presence of a small quantity of alcohol was shown, thus proving the saccharoid nature of the original substance. The tests used were: potassium bichromate with sulphuric acid gave a green color; heated with a strongly alkaline solution of iodine there was developed the odor of iodoform.

After percolation with alcohol, the residue exhausted with cold water gave a light colored liquid which slightly coagulates on boiling. The albumen was separated by filtration and the filtrate precipitated by subacetate of lead, the precipitate collected and freed from lead by hydrogen sulphide, the lead sulphide removed and the filtrate boiled to free it from any remaining hydrogen sulphide. The solution concentrated produces a white precipitate with a solution of gelatin and a black precipitate with ferric chloride, thus showing the presence of tannin. After decolorization by animal charcoal only saline matter remained on evaporation to dryness.

The filtrate freed from lead by hydrogen sulphide, and freed from any remaing hydrogen sulphide by boiling, after concentration produced a precipitate of copper suboxide, when boiled with an alkaline solution of the oxide, and reduced silver in the presence of an alkali.

The residue, after percolation with cold water, was treated with boiling water and macerated for 24 hours and this infusion treated in a similar manner as the cold percolate. It contained starch and was precipitated by gelatin, but not darkened on the addition of ferric chloride.

The filtrate freed from lead and concentrated failed to reduce copper or silver or produce a change with caustic alkali, and on evaporation left a dark brown extract.

The residue, percolated with 10 per cent. ammonia, gave a brown solution which was decolorized by animal charcoal.

Percolation with dilute sulphuric acid now gave a light colored solution which was decolorized by animal charcoal.

One hundred grains of the root (air dry ?) burned in a platinum crucible gave an ash weighing 6·5 grs., of which 3·75 grs. was soluble in water. The ash was found to contain carbonates, sulphates, chlorides and phosphates of potassium, calcium and magnesium.

Under a microscope magnifying 40 diameters, the mericarps are seen to be deeply grooved along the commissures, giving a cross-section the appearance of a horse-shoe. Beneath the epidermis are the five characteristic ribs which are composed of wood bundles. The embryo is of the same shape as the mericarp, white, and appears to be composed of a number of almost square cells arranged in layers parallel to the groove.

The rhizome shows three or four wood rings of a yellow color, traversed by numerous broad medullary rays; the pith is regularly divided transversely by air cavities. The root consists of a number of delicate wedges, arranged somewhat pentagonally around a large pith and traversed by broad medullary rays; the whole structure is of a yellowish-white color, the wood being slightly darker. The rhizome and roots are covered by a yellowish epidermis through which are scattered numerous cells containing a yellow, resinous or coloring matter.

This plant has never been recognized by medical authorities, but is to some extent used throughout the country as a mild carminative and expectorant in the form of infusion and fluid extract.

THE PTOMAINES AND THEIR SIGNIFICANCE IN JUDICIAL AND TOXICOLOGICAL CHEMISTRY.

By Prof. Th. Husemann.

Translated from "Archiv der Pharm.," xvi, December, 1881, pp. 415–424, by Fred. B. Power.

When the formation of ptomaines is particularly frequent in corpses which have been subjected to a slow process of decomposition, it is to be presumed that the same will be not unfrequently observed in the cadavers of persons which have been destroyed by acute arsenical poisoning. To such a probability Selmi had already pointed; but it was only some years later that he succeeded in furnishing the proof

that peculiar bases are here in question, which contain arsenic, and which deviate in their properties from the hitherto known arsines. It will not appear strange that these cadaver bases containing arsenic possess a strongly poisonous action, as is indeed the case with the various artificially prepared arsines.

Selmi[1] had already in 1878 reported two cases in which strongly poisonous and crystalline ptomaines were found by him in exhumed bodies containing arsenic. In the first case the subject was that of a corpse exhumed fourteen days after burial, which appeared well preserved, and in which a large amount of arsenic was detected. By the search for alkaloids with ether in the liquid made alkaline with baryta, a small quantity of a substance having an alkaline reaction and a sharp and bitter taste was found; it crystallized readily in needles, gave with acids crystallizable salts, and precipitates with the principal alkaloidal reagents, but not with platinic chloride, with which a precipitate was only obtained in very concentrated solution. With sulphuric acid this ptomaine gave a reddish coloration; with iodic acid, and afterward with sulphuric acid, free iodine was liberated and a violet coloration produced, which completely disappeared by neutralization with sodium bicarbonate; nitric acid colored it beautifully yellow, and by saturation with caustic potassa this color appeared still more perceptible; sulphuric acid containing nitric acid produced only after some time a reddish coloration; iodine in hydriodic acid gave no crystalline product. The amount of material did not suffice for a more complete chemical and physiological examination.

A short time afterwards Selmi succeeded in obtaining larger amounts of a more readily crystallizable ptomaine from a body containing arsenic, which had been exhumed one month after death. For obtaining the same the liquid obtained by extracting with aqueous alcohol was concentrated at from 35 to 45°C. to 70 cubic centimeters, then made alkaline with baryta, and shaken with ether. After the separation of the ether by distillation and spontaneous evaporation, there remained 5 cubic centimeters of a turbid and somewhat colored aqueous liquid, having an alkaline reaction and a sharp, somewhat bitter taste. After the addition of a little water containing acetic acid, with which the retort used in distilling was washed, filtration, and evaporation to dryness at a moderate temperature, the residue was taken up with

[1] Atti della R. Accad. dei Lincei, Ser. 3, vol. 2, 1878.

water, whereby a little coloring matter remained undissolved, the solution made alkaline with a little baryta, and the extraction with ether repeated. By the treatment of the alkaloid, which was thus obtained nearly colorless, with water containing acetic acid, evaporating to dryness, and again dissolving, a colorless solution was finally obtained which showed the following behavior toward alkaloidal reagents:

Tannic acid, a white, permanent precipitate.

Iodine in hydriodic acid, a kermes-brown precipitate, gradually disappearing, and furnishing microscopical colorless and branched, but no yellow or brown crystals.

Platinic chloride, no precipitate, but in the course of time yellow crystals appeared, which were different from those of platinic chloride.

Auric chloride, a yellow precipitate was directly produced, and in a short time reduction to metallic gold.

Mercuric chloride, a white precipitate.

Potassium bichromate, no precipitate.

Picric acid produced directly a yellow precipitate, which in time changed to long, crystalline tables of a yellow color.

The evaporated residue of the solution in question dissolved in cold concentrated sulphuric acid without coloration, although on warming a slight red color was produced, which did not change to brown. Sulphuric acid and potassium bichromate gave no color reaction. With Fröhde's reagent the solution remained likewise uncolored; a light yellow color which appeared after standing for an hour disappeared quickly, as also the insignificant brown coloration on warming. With iodic acid no iodine was liberated, even after the addition of several drops of sulphuric acid; but, on warming, free iodine appeared quickly, and on saturating with sodium bicarbonate the violet coloration disappeared. Sulphuric acid containing nitric acid produced a permanent, beautiful lemon-yellow coloration. Nitric acid produced, likewise, such a coloration, which, on saturating with caustic potassa, changed to orange; on warming the yellow color remained, and by the evaporation of the solution over a moderate alcohol flame a material of the same color was obtained, which, on the approach of a glass rod moistened with ammonia, passed into an intense orange color.

In order to ascertain whether arsenic was contained in the ptomaine, the strongly poisonous property of which Prof. Vella had demonstrated by an experiment on a frog, Selmi sought to destroy the same

with nitric acid, but this did not succeed, as an ochre-yellow residue remained, which also resisted the action of aqua regia. A better result was obtained by treatment with sulphuric acid and saltpetre. The dry substance dissolved in hydrochloric acid gave neither a yellow coloration nor a precipitate with hydrogen sulphide, even after 18 hours, which, as several milligrams were employed for oxidation, would demonstrate the absence of arsenic. As the difficulty of destruction of this base showed an analogy to those substances containing phosphoric acid, the residue obtained by the evaporation of the hydrochloric acid solution was dissolved in nitric acid, and the molybdic acid reagent added; but neither a yellow coloration nor precipitation ensued, so that the presence of phosphorus cannot come in question.

While in these ptomaines the presence of arsenic could not be definitely proven, Selmi succeeded later in discovering organic bases containing arsenic in the stomach of a hog, which had been preserved in a solution of arsenious acid in a closed vessel in a cool room. On opening the vessel no corrupt odor was perceptible, and also no inclination to the destruction of the tissue. The liquid, which had a slightly alkaline reaction, yielded on distillation in a current of hydrogen a clear alkaline distillate, in which isolated white and fatty flakes were found floating. After careful saturation of the filtrate with hydrochloric acid and evaporation in a bath of salt water, a white, non-deliquescent hydrochlorate remained in cross-shaped crystals, which on exposure to the air remained dry, and when moistened with a drop of solution of caustic soda developed a peculiar odor, which resembled to a certain extent that of trimethylamine, although the base could be neither confused with the latter, with other methylamines, nor with propylamine. The hydrochlorate of this volatile base was definitely recognized as containing arsenic, as Selmi found by destroying it, then oxidizing with nitric acid, taking up the residue with sulphuric acid, reducing the arsenic acid by means of sulphurous acid to arsenious acid, and finally testing in Marsh's apparatus. This body gave with *tannic acid* no precipitate; with *iodine* in *hydriodic acid* a precipitate of beautiful crystals of a gray color and the appearance of iodine; with *picric acid* a yellow precipitate, which changed to long, yellow felt-like needles. *Auric sulphate* gave no precipitate, but a very small amount of a powder consisting of very small and transparent microscopic crystals was deposited. Also *potassio-bismuthic iodide* and *phospho-wolframate of sodium* gave at first no precipitate,

but afterwards the former deposited a few yellow flakes and the latter a white precipitate. *Platinic chloride* gave directly a granular, canary-yellow precipitate of microscopic octahedrons. *Auric chloride* gave only in very concentrated solution an insignificant precipitate, which under the microscope consisted of fine, yellow rhombic tables. *Mercuric chloride* produced even in highly concentrated solutions no turbidity. According to experiments made by Prof. Ciaccio with 24 milligrams of the substance, this base is most intensely poisonous and resembles strychnine in its action.

In order to ascertain whether, besides this volatile base, a fixed alkaloid was still contained in the liquid remaining on distillation and in the solid matter, the latter was comminuted, the residue from the retort poured upon it, acidulated with tartaric acid and four times its volume of alcohol added; after digesting till the following day, the alcoholic liquid was separated from the solid matter, the latter again extracted with alcohol, the alcoholic liquids filtered, combined and distilled in vacuo until the alcohol was entirely expelled. The brown residue was made alkaline with barium hydrate and shaken three times with ether. By the distillation of the brown liquid obtained by the first treatment with ether, which possessed an alkaline reaction, a distillate having a peculiar odor was obtained which differed from that of the previously described volatile base. After spontaneous evaporation there remained a residue, which after some days acquired an unendurably disagreeable odor, although the base had been converted into hydrochlorate, which afterwards deliquesced. The small quantity prevented an exact examination.

The residue from the distillation of the ether was brown, glutinous, alkaline and nearly insoluble in water. After treatment with very dilute hydrochloric acid with the aid of heat and filtering off the separated fatty matter, as also after the purification of the yellowish-colored filtrate by treatment with baryta and agitation with ether, a distillation residue was obtained having an alkaline reaction and a somewhat cadaverous odor which, at first slightly colored, by exposure to the air became brown and at the same time insoluble in water. By the addition of a few drops of dilute hydrochloric acid, until the reaction was feebly acid, and moderately warming, a yellowish solution of somewhat disagreeable odor and bitter taste was obtained, which, when brought upon the tongue, produced a prurient sensation and afterwards loss of sensibility. This gave with *tannin* a slowly

separating, yellowish precipitate; with *hydriodic acid containing iodine* a yellowish-red precipitate and brown drops; with *platinic chloride* a yellowish powder, that even after several hours did not become crystalline; *auric chloride* gave a yellowish precipitate, and in a short time reduction ensued; *mercuric chloride* and *potassio-mercuric iodide* gave yellowish-white precipitates; *potassio-bismuthic iodide* an orange-yellow precipitate, changing to red; *picric acid* a non-crystalline, and potassium bichromate a reddish-yellow precipitate.

This alkaloid also contained arsenic and, according to the experiments made by Prof. Ciaccio on frogs, possessed a poisonous action which, however, was different from the strychnine-like action of the volatile arsine and was connected with the ordinary action of the poisonous ptomaines. Torpor, paralysis and systolic inactivity of the heart were the most prominent phenomena.

The communicated research of Selmi throws light upon one of the darkest portions of the history of toxicology, to the time of Toffa and other professional poison mixers, who understood rendering the activity of arsenious acid to a certain extent more potent. With the "Aqua toffana," the so-called "Acquetta di Perugia" played at the same time in Italy a not insignificant part. According to the tradition, this secret compound of the poison mixers of the 17th and 18th centuries was prepared by killing a hog, disjointing the same, strewing the pieces with white arsenic, which was afterwards rubbed in, and collecting the arsenical liquid which dropped therefrom. A liquid obtained in this way was said to have possessed a much more poisonous action than a simple solution of arsenious anhydride. There can be no doubt that by the longer preservation of pork or any other kind of meat, peculiar arsines were formed, and impart to the arsenical brine poisonous properties which surpass those of the arsenious acid, at least when applied in the solid form. It must also be considered that by this process compounds of arsenious acid with inorganic alkalies are also undoubtedly formed, which are more readily absorbed than the arsenious acid, and that the respective procedure had for its purpose to bring the largest possible amount of arsenious acid into solution. The same object was presumably in view by the preparation of the Aqua toffana with the addition of a plant juice, for which as is known that of Linaria Cymbalaria was added. Selmi and Vella presume that through the Acquetta di Perugia the concealment of the action of the arsenic on the one hand and of the tetanic poisons

on the other was accomplished. This supposition, which is based on an observation of Vella in a case of complex poisoning with arsenic and strychnine, does not agree perfectly with the experiments on warm-blooded animals by which, through the simultaneous application of arsenite of potassium and strychnine, the tetanic spasms were not prevented, provided that the strychnine was given in a toxic dose.

From still another point of view the ptomaines containing arsenic appear to be of significance in toxicology, from the fact that they help to explain an affection, that of chronic arsenical poisoning, as produced by arsenical wall-papers. As Selmi has shown that a volatile arsine is formed by the contact of arsenious acid and albuminous matters, which possesses a strongly toxic action and differing somewhat from that of arsenious acid, the author thinks it may be presumed that a similar product can be formed from the glue which is employed for affixing the arsenical wall-paper of a room, whereby perhaps the moisture of the air plays a part in the formation of the arsine.

ANALYTICAL RESEARCHES AND INVESTIGATIONS.

COLLATED BY PROF. FREDERICK B POWER, PH.D

Dectection of Chloroform in Cases of Poisoning. By D. Vitali.—The author brings the liquid which has been distilled from the intestines into a three-necked flask, and conducts a current of hydrogen through the same. The hydrogen which escapes through a glass tube provided with a platinum point is then ignited. If chloroform is present in the liquid, it will be carried along with the hydrogen, and burn with the formation of hydrochloric acid. If a piece of fine copper wire be now held in the flame, the latter, in consequence of the formation of cupric chloride, will assume an intense green color. A small, scarcely visible drop of chloroform, when mixed with 30 cubic centimeters of water, will produce the green coloration very perceptibly.—*Chem. Zeitung*, 1882, No. 3, p. 47, from *Giorn. Farm. Chem.*, 30, p. 529.

Examination of Meal for Impurities.—The meal is gently warmed with 70 per cent. alcohol to which 5 per cent. of hydrochloric acid has been added. With pure wheat and rye meal the alcohol remains colorless, barley and oat meal color it pale yellow, corn meal and the bearded darnel (Lolium temulentum) orange, vetch and bean meal purplish-red, and ergot blood-red.—*Ibid.*, from *Biedermann's C.-Bl.*, ii, 69.

The Volatile Oil of Angelica. By M. Naudin.—From the fruit of Angelica Archangelica by distillation with water a volatile oil is obtained, which has the specific gravity 0·872 and an agreeable odor. By exposure to the light it soon becomes colored yellow, and by exposure to the air, through absorption of oxygen, becomes resinified. Under ordinary pressure it has no constant boiling point; it begins to boil at 174°C., although portions pass over even at 330°C. By distillation in vacuo 75 per cent. of distillate is obtained, which under a presure of 22 millimeters, boils at precisely 87°C. This liquid has the formula $C_{10}H_{16}$, and is thus isomeric with turpentine oil, but is different, however, from all similarly composed hydrocarbons; it is colorless, has an odor reminding of hops, and an injurious effect upon the organs of respiration which is similar to that produced by fusel oil. Its boiling point is 175°C., the specific gravity 0·833, and coefficient of rotation $+25° 16'$; the latter decreases constantly when the oil has been heated to 100°C., in a sealed glass tube, until it reaches a minimum of $+9° 44'$. The liquid thereby becomes thick, and polymerized to a hydrocarbon, resembling the β-isoterebenthenes, which is already contained in the crude angelica oil, and for which the author proposes the name of terebangelene. By the action of the halogens a violent reaction ensues with the formation of cymol.—*Ibid.*, No. 4, p. 68, from *Compt. Rend.*, 93, p. 1146.

The Detection of Small Amounts of Iodoform and Substances yielding Iodoform.—On heating an alkaline solution of resorcin with even very small amounts of iodoform a red coloration is produced, which again disappears on the addition of an acid. This reaction may be readily employed for the detection of small amounts of substances yielding iodoform, as alcohol, acetone, etc. As is known such substances are recognized by warming the liquid to be examined, adding a solution of iodine in potassium iodide or potassium carbonate, and then sufficient solution of sodium hydrate, drop by drop, until the brownish-yellow color is nearly discharged. On agitation and standing, the iodoform, separates as a bright yellow crystalline precipitate, which, under the microscope, appears in the form of regular six-sided tables or roundly-pointed laminæ. As on the one hand small amounts of iodoform remain dissolved, particularly in alcoholic liquids, and on the other hand the microscopic examination of the precipitate is somewhat circumstantial, it is recommended to gently warm the liquid containing iodoform, obtained by the above method, with the further ad-

dition of alkali and a little resorcin. The above mentioned characteristic red coloration of the liquid then appears.—*Pharm. Centralhalle,* 1882, No. 2, p. 15, from *Ber. d. Oest. Ges.*, iii, p. 75.

Examination of Beer. By Prof. Dragendorff.—In the examination of beer for foreign bitter principles the following method has been found to yield good results. About 2 liters of the beer are heated on the water-bath until the carbonic acid gas and about half of the water have become expelled. To the liquid, while still hot, basic acetate of lead, containing as much oxide as possible, is added, and finally ordinary basic acetate of lead with the addition of ammonia water, until a precipitate is no longer produced; the precipitate, which should not be washed, is quickly filtered, in order to protect it from the carbonic acid of the air, and from the filtrate the excess of lead precipitated by the required amount of sulphuric acid. The quick deposition of the sulphate of lead may be accomplished by the addition of about 40 drops of an aqueous solution of gelatin (1:20) before adding the sulphuric acid. The liquid, after being again filtered, should no longer taste bitter, if the beer was unadulterated. For further examination ammonia water is added to the liquid until all the the sulphuric acid and a portion of the acetic acid is neutralized (until methyl-violet is no longer rendered blue by a few drops of the liquid), and evaporated on the water-bath to from 250 to 300 cubic centimeters. The residue is mixed with 4 times its volume of absolute alcohol, in order to precipitate the dextrin, etc., the mixture well agitated, and, after standing for 24 hours in a cool place, filtered. After again removing the larger part of the alcohol by distillation the acid liquid is successively agitated with petroleum ether, benzol and chloroform, and this operation repeated with the same solvents in the stated order, after having previously rendered the liquid decidedly alkaline with ammonia water.

Pure beer, prepared from malt and hops, when treated according to this method shows the following behavior:

A. Absorbed from the acid solution.

1. Petroleum ether (boiling at from 33 to 60°C.) takes up but very little of the solid and liquid constituents of beer, among the latter the fusel oil which is contained in all beers. The solid portion of the evaporated residue obtained by agitation with the petroleum ether has scarcely a bitter taste, and is dissolved by concentrated sulphuric acid, sulphuric acid and sugar, as also by nitric acid with but a slight

yellowish color, while concentrated hydrochloric acid forms a nearly colorless solution.

2. Benzol (freshly rectified and boiling at from 80 to 81°C.) takes up only very small quantities of a resinous substance, which in its behavior toward the above-mentioned acids resembles that obtained from the petroleum ether solution, and which, when dissolved in dilute sulphuric acid (1:50) gives no precipitate with the ordinary alkaloidal reagents—iodine and bromine solution, potassio-mercuric and potassio-cadmic iodides; gold, platinum, ferric and mercuric chlorides; picric and tannic acids, and potassium bichromate—and does not reduce chloride of gold upon warming. Phosphomolybdic acid produces only after standing for some time a very slight turbidity. This substance also possesses but a feebly bitter taste.

3. Chloroform corresponds in its behavior to benzol.

B. Absorbed from the ammoniacal solution.[1]

1. Petroleum ether takes up little or nothing.

2. Benzol removes but traces of a substance, which occasionally crystallizes from the etherial solution, but which gives no characteristic color or physiological reactions similar to those of strychnine, atropine, hyoscyamine, etc.

If the beer has become sour before being examined, it will show a similar behavior upon agitation with these liquids, but from the properly prepared acid liquid a substance will be extracted (in small amount) by benzol and chloroform which, upon warming, reduces chloride of gold, and usually also nitrate of silver. Beer worts shows the same behavior as fermented beer.

In regard to the special reactions of the individual bitter principles, as also of the alkaloids which here come under consideration, and which may be isolated according to the above method and subsequently recognized, reference must be made to the original essay, or to Dragendorff's "Gerichtlich-chemische Ermittelung von Giften," where most of the detailed reactions have been previously published.

Glycerin is determined, according to V. Griessmayer, by evaporating 100 cc. of beer in a shallow capsule on the water-bath, as slowly as possible, and at a temperature of from 65 to 75°C. After the dissipation of the carbonic acid gas about 5 grams of magnesium hydrate are added, and the mixture repeatedly stirred with a glass rod so that

[1] Before rendering the liquid alkaline it should again be shaken with petroleum ether in order to remove the last portions of chloroform.

finally a homogenous, thick liquid mass is formed; but should not be evaporated to complete dryness. The capsule is then removed from the water-bath, about 50 cc. of absolute alcohol added, the mass triturated with a pestle, decanted into a large beaker, and the residue, which has been mixed with 20 cc. of absolute alcohol, filtered. To the mixed liquids 300 to 350 cc. of absolute ether are added, with active agitation by means of a glass rod, filtered from the flocculent deposit (parapeptone and maltose), the filter washed with a little ether-alcohol (3:1), and the filtrate finally allowed to evaporate spontaneously in a shallow capsule. The residue remaining from the treatment with alcohol is evaporated on the water-bath—with the above-mentioned precautions—to a syrupy consistence, and allowed to dry in rarefied air for 24 hours. The residue thus obtained is again dissolved in from 15 to 20 cc. of absolute alcohol, the solution filtered through a very small filter into a tared glass capsule, in which it is evaporated, and, after drying for 12 hours in rarefied air, it is weighed.

For light beers, which contain but little or no parapeptone, the operation may be simplified by not precipitating by ether the liquid first obtained by extraction with alcohol, but evaporating directly, and digesting the residue with ether-alcohol (1:1) instead of with alcohol, filtering, evaporating, and weighing.[1]—*Zeitschrift für Analyt. Chemie*, 1882, p. 137; *Chem. Centralb.* [3. F.] 12, p. 285.

NOTE ON SYRUPUS FERRI PROTOCHLORIDI.

By A. Früh.

The editorial remark in the last number (p. 129) that a syrup of ferrous chloride is made in France by simply dissolving protochloride of iron in simple syrup is suggesting the question why this preparation is hardly ever prescribed in France? The reason is that it is a very weak iron preparation, in which the iron as contained in the neutral salt is far from being readily assimilated by the blood. FeCl needing HCl to form an oxychloride by the action of oxygen in the blood-vessels. This oxychloride, which has necessarily to be the first alteration of the FeCl to undergo by the action of the oxygen, being

[1] This procedure is also adapted to the estimation of glycerin in wines (50 cc.), with the modification that the residue is digested with ether-alcohol (2·1); from highly colored red wines a slightly yellowish colored glycerin is thus obtained.

a very unstable combination, will readily be reduced by the action and heat of the blood to the combination of iron and oxygen which it is able to assimilate.

Syrupus ferri protochloridi is prepared by me on the same principle as the tinctura nervina Bestuscheffi or tinct. ferri chlorati ætherea of the German Pharmacopœia, which is a highly valued and much-prescribed iron preparation. In this tincture the ferric chloride is reduced to ferrous chloride in the rays of the sun by the ether forming chloride of ethyl, leaving the ferrous chloride as a colorless solution. In syr. ferri protochl. the sugar will, by the action of the iron, lose two atoms of hydrogen, giving them to the chloride of the Fe_2Cl_3 and reducing it to FeCl, forming HCl and saccharic acid, no grape sugar or glucose being formed by the reduction.

This is the case in the syrupus ferri chlorati of Hager's Pharmac. Manual, which is about five times the iron strength of my preparation and made by ebullition, which will form grape sugar and make the whole preparation changeable and unreliable.

The slight changes I have remarked in my preparation are the formation of very small quantities of oxychloride, causing the liquid to assume a yellowish tint and, in very high summer temperature, the assumption of the syrup of a slightly brownish color, caused probably by the absorption of oxide of nitrogen, which is a quality possessed by all the ferrous salts.

In making this syrup I was guided principally by the idea that this preparation, made on the same principle as tinct. ferri chlorati ætherea, might be just as valuable as an iron preparation and more useful, containing the iron in a palatable, active and easily absorptive state.

Greenville, March 14, 1882.

Remarks on Syrup of Ferrous Chloride.—In making the brief editorial remark on page 129, our object was simply to direct attention to the only officially recognized formula for such a preparation; that quoted has been adopted by the Paris Pharmaceutical Society and, we presume, is used sufficiently there to warrant the official adoption of a formula. Many other formulas have, from time to time, been suggested, one of the latest being that proposed by Mr. Wm. Gilmour, in the "Chemist and Druggist," June, 1881, p. 251, which directs 288 grains of officinal hydrochloric acid, diluted with $1\frac{1}{2}$ oz. of water, to be saturated with iron, the hot solution to be fil-

tered and mixed with sufficient syrup to make 10 fluidounces. This, like the French syrup, contains no excess of hydrochloric acid, upon which our correspondent lays so much stress.

The formulas given by Hager order the preparation of this syrup from *ferrous chloride*, either dry or in solution, by mixing it *in the cold* with simple syrup; these preparations are intended to contain a minute quantity of free hydrochloric acid. We quote from Hager's "Manuale" and "Praxis" as follows:

SYRUPUS FERRI CHLORATI.

℞ Ferri chlorati in solutione parati, . .	1·0
Solve in syrupi sacchari	100·0
Acidi hydrochlorici, ...	guttis 5
Paretur ex tempore.	("Phar. Prax.")
℞ Ferri chlorati, ...	p. 30
Acidi hydrochlorici puri, . . .	p. 3
Syrupi sacchari, ...	p. 480
Solve et misce.	("Manuale.")
℞ Liquoris ferri chlorati (p. spec. 1·250—1·255), .	p. 4
Syrupi sacchari, ...	p. 20
Misce.	("Manuale.")

The statement of our correspondent that, by the process suggested by him, no glucose is formed, will doubtless be modified on further examination. Since Raoult has shown, in 1871, that a solution of pure sugar in water, kept in vessels from which the air has been removed and exposed to the light, contains notable quantities of glucose, we have examined many samples of syrups made with refined cane sugar and found them to be free from glucose immediately after they had been prepared, but to respond to the tests for glucose after comparatively brief exposure to diffused daylight in the store. The formation of saccharic acid under the conditions stated by our correspondent requires proof, and the browning of ferrous solutions will be found to take place in an atmosphere containing oxygen and totally devoid of nitrogen oxides.

The Preparations of Digitalis have been examined for their effectiveness by A. Fraenkel by making subcutaneous injections to medium-sized dogs which had been brought under the influence of curare. The lessening of the pulse, with an increased volume of the beats, was regarded as the beginning of the effects. The tincture was found to be the least reliable, and the vinegar the most active preparation; but the doses of the vinegar, as well as of the infusion, necessary for the production of these effects were found to be variable.—*Archiv d. Phar.*, Dec., 1881, p. 451, from *Arch. Klin. Chir.*, xvii.

TINCTURA CARDAMOMI COMPOSITA.

By Frank M. Wilson.

Read before the Connecticut Pharmaceutical Association, Feb. 8, 1882.

Query.—The compound tincture of cardamom of the Pharmacopœia precipitates badly. Can any proper substitute for the honey be used which will be an improvement?

This preparation has always been considered one of the elegant tinctures, highly esteemed therapeutically for its carminative properties, either by itself or in combination with stomachics; it is largely employed as a flavoring and coloring agent, with or without viscid ingredients; hence it is one of the important tinctures of the Pharmacopœia. Our query truthfully says the officinal tincture "precipitates badly," and inquires for a remedy, a substitute for the honey, to which it attributes the precipitation. As the honey of commerce is, in the main, artificially produced from glucose, the common adulterant of saccharine principles, in the manufacture of which more than twelve million bushels of corn were manipulated last year in this country alone, by submitting the starch to the action of dilute sulphuric acid and heat, saturating it with some earthy carbonate to remove the acid, and purifying; and as glucose is a cheap, imperfect substitute for pure bees' honey, aggravating dyspeptic symptoms, setting up fermentative processes, causing flatulence and painful affections of the bowels, it may be well to eliminate it from the working formulæ on therapeutic grounds.

The British Pharmacopœia employs raisins where that of the United States directs honey. My friend, Mr. Sykes, has used the British formula with gratifying results, producing a more perfect tincture. I have had no experience with it. After accepting this query I began, in a small way, a series of experiments by preparing a quantity of the tincture by the U. S. P. process of percolation, save that I mixed the whole drugs and ground them together, as I believe that to be the better proceeding with all compound tinctures. I prepared three sixteen ounce bottles, and filled them with the tincture; to one I added honey in the requisite proportions; to the second, syrup (U. S. P. specific gravity 1·317); and to the third, Bower's glycerin; these were severally filtered, tightly stoppered and, March 1st, set in line, where they were subject to the light and changing spring and summer temperature of the shop. At the expiration of twenty-four hours,

in the officinal honeyed tincture was observable traces of precipitation in flocculæ; in two weeks' time a thick, unsightly sediment had fallen to the bottom. At this time the tincture containing the cane sugar was found to be in a state of precipitation, though not to the extent of the officinal, and at this writing, ten months from date of manufacture, contains fifty per cent. less of sediment. The sample containing glycerin did not exhibit signs of precipitation for some weeks, but at the end of three months had cast down an objectionable amount of extractive matter, but much less than either of the others. I could have stopped here and complied with the requirements of the query by offering glycerin as a proper substitute for the honey, but my three samples contained precipitates in a greater or less degree, and no one of them came up to the standard of a perfect tincture, which should be a *perfect solution, remaining transparent.* Inasmuch as the carminative and stimulating properties of the ingredients, cardamom, caraway and cinnamon, consist in their volatile oils, and knowing that alcohol was the better solvent of these active principles, I reasoned that an increase of the alcoholic strength of the menstruum would not only make a better solution, but tend to prevent precipitation. I could see no therapeutic objection to thus increasing the volume of alcohol, as the tincture would hardly be administered in large doses; accordingly I prepared a tincture by the following formula:

Cardamom,	4	parts	No. 50 powder.
Cinnamon,	4	"	
Caraway,	2	"	
Cochineal,	1	"	
Alcohol,	133	"	To be mixed in the proportion of.
Glycerin,	12	"	
Water,	44	"	
To make	200	"	

Mix the solid ingredients, powder them together, pass through a No. 50 sieve. Moisten the mixture with half an ounce or q. s. of the menstruum, pack in a cylindrical percolator, gradually pour the remainder of the menstruum upon it, afterwards diluted alcohol to obtain 200 parts.

This sample was completed June 15th, and placed with the other three; it has stood a test of seven months and presents an elegant appearance, free from sediment. I would offer the above formula as the best solution of the query my limited experiments have enabled me to deduce.

NOTE ON CONFECTION OF SULPHUR.

BY PETER BOA.

Read at a Meeting of the North British Branch of the Pharmaceutical Society, February 8, 1882.

The formula for confection of sulphur in the British Pharmacopœia was intended, I apprehend, to afford physicians a convenient means of prescribing sulphur in a more elegant way than the old-fashioned one of suspending it in treacle.

That the pharmacopœial preparation has not gained the favor of prescribers, or patients for whom it has been ordered, or superseded to any appreciable extent the old electuary, must, I think, be the experience of most of us. This is due, I believe, to the fact that it is unsatisfactory. When kept even for a few days, separation occurs, the sulphur subsides and the syrup remains on the top, necessitating a new mixing before a dose can be taken. And if it only be considered how nasty an operation it is to stir it up, say in a 2-ounce pot, especially if the pot be nearly full, it need not cause surprise that patients reject it on this account.

Recently prepared it is very elegant and palatable, and under the conviction that if it could be made in such a way as to retain the sulphur in complete and permanent suspension it would be a most acceptable form in which to administer this medicine, I have from time to time tried various expedients with a view to accomplish this. After a considerable number of unsuccessful experiments, which I need not here describe, it occurred to me to try tragacanth. At first I used too much and the result was a confection of too firm consistence. However, the separation was most effectually prevented, and my next proceeding was to determine the smallest quantity of the gum that would effect this. The quantity which I have found to give most satisfactory results is 2 grains to an ounce. The confection prepared with this addition appears to be all that could be desired; it is soft yet inseparable.

Samples are shown prepared with the addition of the tragacanth, and according to the formula in the Pharmacopœia, at the same time, and it will be seen that those containing the tragacanth are in perfect condition, while the others have a stratum of supernatant syrup which can be poured off without disturbing the sulphur.

With this suggested addition the formula for confection of sulphur would read thus:

Sublimed sulphur, ...	4 ounces.
Acid tartrate of potash in powder, . .	1 ounce.
Tragacanth in powder, ...	18 grains.
Syrup of orange peel, ...	4 ounces.

Rub the powders together and mix thoroughly with the syrup.—*Pharm. Jour. and Trans.*, February 18, 1882.

COLD CREAM, OR THE CERATUM GALENI.

By James Mackenzie.

Read at a Meeting of the North British Branch of the Pharmaceutical Society, February 8, 1882.

Though this article may not properly be termed a pharmaceutical preparation, it is yet one which, at certain seasons, is in such popular demand as to render it a matter of interest to the chemist and druggist. It is, besides an article so susceptible of various changes, that, in spite of all that has been done to avert them, new efforts require to be made, in order to secure a stable and uniform preparation.

Galen, the celebrated physician of Pergamos, is accredited with the invention of this well-known unguent. In ancient, as in modern times, it was compounded of very simple constituents, viz., grease, water and perfume, and (need we say) is known in pharmacy under the title of *Ceratum Galeni.* No doubt, very considerable changes have been introduced at different times into its composition, which have affected alike its odor and quality; yet practically the oleaginous ingredient with water has been retained during so long a period as seventeen centuries. We may safely conclude, however, that with all the appliances of modern times the article as prepared in our day must present a marked improvement on the ancient ceratum of Galen.

My object, at present, is not to trace the history of this esteemed preparation, nor to give an account of the manner in which any of the numerous formulas may be compounded; much less is it to give reasons for failure in the efforts of careful pharmacists who have endeavored to effect permanent improvments in the article. Suffice it to say that we know from experience probably more than enough of such things. All I wish to advance is that in presence of the difficulties which present themselves in connection with this ceratum I have been

forced to the conclusion that it is impossible absolutely to secure from the given ingredients of it such qualities as are popularly expected. After careful consideration of past failures, I have ventured to inquire whether the difficulty might not be overcome by one or other of the recent discoveries in chemistry. Accordingly, several months ago, my attention was drawn to an entirely new agent, termed *white adepsine*, a mineral product, which is manufactured under the superintendence of Professor R. Fresenius. The new agent in question is absolutely neutral, chemically pure, void of odor, and unaffected by the action or temperature of the air. It retains the perfect purity of its color after repeated exposure to heat, and it readily combines with oils, whether fixed or essential, in various proportions. Alone, or in substance, the *white adepsine* is rather hard, more particuarly after it has been melted. By the addition of pale almond oil, and flavored with the finest otto of roses, a product is formed which may well be termed *cold cream.*

I have prepared and supplied this article, and I find that it is universally liked, and that in point of adaptability it is all that can be desired. In my opinion, white adepsine is a product which will form an important factor in pharmacy and will prove a boon to chemists. It will take the place (as I conceive) of other substances which have not been found so well fitted for certain special ends. I am well aware that this looks like the language of pretension. I am also aware of the common objection to new proposals. To adopt and introduce adepsine, it may be said, is to upset all our associations with an unguent in common use from time immemorial. Admitting all this, it would be nothing strange to hear of constant changes in the annals of chemistry. It would be only one step more in the history of minerals or of the mineral oils. It is permissible to say, in a word, that if by the means proposed a new and better article is introduced, the change from an old to a new formula will, like so many others in our day, be more than justified by the results.

N. B.—The formula which I have adopted is:

To each pound of white adepsine add 2 oz. pale almond oil and $\frac{1}{2}$ dram otto of roses.

Melt the adepsine in a water-bath, then add the *oil*, and when it assumes a slightly opaque appearance, add the *otto* and fill into pots in the usual way. Should it be considered desirable to have the rose-water added, it may be combined in the proportion of one part to seven.—*Phar. Jour. and Trans.*, Feb. 18, 1882.

THE EXTRACTION OF FAT FROM NUX VOMICA.

BY T. EDWARD GREENISH.

In the "Pharmaceutical Journal" of November 26, 1881, in a paper by Mr. Hallberg, read before the American Pharmaceutical Association there occurs the following statement:

"A portion of the same nux vomica was exhausted with "benzin," which left upon evaporation about 5 per cent. of a light greenish-yellow fixed oil which did not show any presence of alkaloids."

In the "Year-Book of Pharmacy" for 1875, p. 20, it is stated that Mr. C. Bullock obtained from 4 oz. of oil, separated from the extract by heating, 10·6 grains of alkaloid. ("Am. Jour. Phar.," 1874, p.405.)

In the same publication for 1877, p. 225 ("Am. Jour. Phar.," 1877, p. 3), L. Wolff remarks concerning the treatment of nux vomica by petroleum spirits: "The oil derived from the "benzin" exhaust to make sure of not losing any strychnine or brucine that may be contained therein, should be repeatedly shaken with dilute alcohol until the washings fail to betray to the palate the specific bitter taste of their alkaloids, then the washings must be mixed with the extract in the course of evaporation."

Wolff used a petroleum spirit, but Hallberg does not specify the origin of his solvent. I take it, however, without doubt to be the same petroleum spirit as is generally used in America for such purposes as extraction of fat, etc. (See Maisch, "Am. Jour. Phar.," 1872, p. 334.)

The presence of oil in extract of nux vomica was an objection which induced me about two years ago to try the process of percolation with petroleum spirit; but on shaking the oil thus obtained with water acidulated with dilute sulphuric acid, and adding potash to the acid solution after separation, the quantity of alkaloid precipitated was so large that the process was not adopted.

My experience being, therefore, contrary to that of Mr. Hallberg, I resolved, on reading his paper, to estimate the amount of alkaloids extracted with the oil by petroleum spirit. With this object in view I percolated 8 oz. of powdered nux vomica with the spirit until exhausted of oil. The product, measuring 10 oz., was shaken repeatedly with water acidulated with sulphuric acid, and the acid solutions were concentrated to a small bulk and precipitated with solution of caustic soda. The precipitate, washed and dried at 100°C., weighed

·3185 gram. The filtrate and wash water were shaken with chloroform and the chloroform solutions evaporated to dryness; the residue (principally brucia), dissolved in acidulated water and precipitated with soda, weighed ·0385 gram.

This gives a total of ·357 gram of alkaloids from 8 oz. (or 227 grams) of nux vomica, or ·157 per cent., a quantity equal to about $\frac{1}{6}$ of the total amount of alkaloids contained therein. From this it is evident that petroleum spirit will remove a considerable proportion of strychnine and brucine from nux vomica, and the resulting extract will be correspondingly deficient in active principle. In the above experiment the nux vomica, although exhausted of oil, continued to yield its alkaloids to petroleum spirit.

I have found, however, that percolation with coal-tar benzol extracts no alkaloid. It cannot, therefore, be the fixed oil which carries the alkaloid into solution, as is sometimes assumed in similar cases.

Should a dry extract be required, care must be taken to shake the solution with acidulated water and to precipitate the alkaloids as above, or to remove them by dilute alcohol, as recommended by Mr. Wolff.

I may add that the hydrocarbon spirit used was a petroleum product, sp. gr. ·700.—*Phar. Jour. and Trans.*, Jan. 14, 1882.

POISONING BY ACONITINE.

By P. C. Plugge.

Abstract of a paper in the "Archiv der Pharmacie" for January.

In April, 1880, a case of death by poisoning occurred at Winschoten, in Holland, which was supposed to have been due to an error in dispensing a mixture containing nitrate of aconitine. In connection with the judicial investigation, the authorities submitted to Professors Plugge and Huisinga, of Groningen, (1) a mixture, (2) three samples of nitrate of aconitine and (3) the residue from the evaporation of benzol that had been shaken with the vomit and the contents of the stomach and intestines of the deceased, with a request that they would report upon their relative poisonous properties.

The three samples of nitrate of aconitine were labeled respectively (*b*) Aconitin nitric., from Mastenbroek & Gallenkamp (the firm by whom the mixture was dispensed); (*c*) Aconitin nitric., from E. Merck, of Darmstadt, and (*d*) Aconitin nitric., from Friedländer, of Berlin.

The first examined was the nitrate of aconitin labeled (*b*), since it was the kind used in dispensing the mixture, the prescription for which was as follows:

℞	Aconitini nitrici, ...	0·2
	Tinct. chenopodii ambrosioid., . .	100
	D. S. hourly, 20—40—60 drops.	

It appears that the physician intended Friedländers nitrate of aconitine; but, as he did not say so, the dispenser used a preparation he had in stock and which had been obtained originally from Petit, of Paris. It consisted of hard white crystals, which were difficultly soluble in cold water. A 0·2 per cent. solution was prepared for subcutaneous injection in experiments upon frogs, rabbits, dogs and pigeons.

The sample of Merck's nitrate of aconitine (*c*) was a yellow-brown powder, which dissolved easily in water. As a weaker action was anticipated from this preparation, a 1 per cent. solution was used.

The sample of Friedländer's nitrate of aconitine was a hard, grayish-white, agglutinated gummy mass, very soluble in water. Of this a 1 per cent. solution was used.

The physiological phenomena following the injection of these different solutions are minutely described in the original paper. The difference between the action of Petit's preparation and that of Merck's appeared to be quantitative only, no qualitative difference being observed. Both were powerful heart poisons, death resulting from stoppage of the heart's action. Friedländer's preparation apparently differed in not affecting the heart so much, in proportion to the development of the other aconite symptoms, such as a chewing motion of the mouth, flow of saliva, difficulty of breathing, dyspnœa, etc.

The relative activity of the preparations is shown in the following tables:

(*b*) *Nitras Aconitini, from Petit, Paris.*

	Dose.			Effect.
Frogs,	0·4 mg.	= per kilo	16 mg.	Death in 60 minutes.
Rabbits,	0·8 mg.	"	0·5 to 0·6 mg.	Death in 30 minutes.
Dogs,	1·6 mg.	"	0·21 mg.	Death in 20 minutes.
"	0·45 mg.	"	0·10 mg.	Death in 140 minutes.
"	0·50 mg.	"	0·054 mg.	Recovered.
"	0·66 mg.	"	0·075 mg.	Recovered.
Pigeons,	0·07 mg.	"	0·22 mg.	Death in 21 minutes.

(c) Nitras Aconitini, from Merck, Darmstadt.

	Dose.			Effect.
Frogs,	0·4 mg.	= per kilo	16 mg.	Recovered.
"	1·0 mg.	"	40 mg.	Death in 120 to 360 hours.
"	2·0 mg.	"	80 mg.	Death in 75 to 130 hours.
"	4·0 mg.	"	160 mg.	Death in 52 hours.
Rabbits,	3·5 mg.	"	2 mg.	Death in 75 hours.
"	10·0 mg.	"	6·52 mg.	Death in 15 hours.
Dogs,	10·0 mg.	"	1·65 mg.	Death in 15 hours.
Pigeons,	0·4 mg.	"	1·65 mg.	Recovered.

(d) Nitras Aconitini, from Friedländer, Berlin (=Trommsdorf, Erfurt).

	Do e.			Effect.
Frogs,	4 mg.	= per kilo	160 mg.	Recovery.
"	10 mg.	"	400 mg.	Death after 60 hours.
"	20 mg.	"	800 mg.	Death after 60 hours.
"	40 mg.	"	1,600 mg.	Death after 60 hours.
Rabbits,	6 mg.	"	4·11 mg.	Recovered.
"	24 mg.	"	10 mg.	Recovered.
"	50 mg.	"	85·5 mg.	Recovered.
"	28 mg.	"	6 mg.	Recovered.
Pigeons,	10 mg.	"	33·4 mg.	Recovered.

The quantity of this preparation at the disposal of the experimenters did not allow of an estimate being made of a lethal dose for a warm-blooded animal, but when administered to rabbits in the proportion of 85·5 mg. per kilo of the animal's weight it produced tolerably strong symptoms of poisoning.

From the above figures the following conclusions are drawn:

(1) Petit's nitrate of aconitine has a poisonous action at least eight times stronger than that of Merck's, and one hundred and seventy times stronger than that of Friedländer's.

(2) Merck's nitrate of aconitine has a poisonous action at least twenty to thirty times stronger than that of Friedländer's.

It also appears from the foregoing that the preparations known as "German aconitine" are not always of the same strength, there being a much greater difference between the two German preparations examined than between the more powerful of the two and the French preparation.

In conclusion the author emphasizes the necessity—seeing the great possibility of variation in preparations sent into the market—that physicians should exercise the greatest care in prescribing aconitine and its salts, as the dispensing of a different preparation from that intended by the prescriber may lead to the administration of a fatal

dose, as in the case under investigation, where, instead of Friedländer's preparation, which was intended but not specified by the prescriber, that of Petit, which was one hundred and seventy times stronger, was used. The author also recommends that the official maximum dose in the Dutch Pharmacopœia, of 4 milligrams, or 32 milligrams daily, should be struck out, as in this case it proved fatal.

Comparative experiments with the mixture confirmed the statement that Petit's preparation had been used in dispensing the mixture. Only negative results were obtained with the residue from the vomit, etc.—*Phar. Jour. and Trans.*, Feb. 18, 1882.

CHINESE METHOD OF MANUFACTURING VERMILION.

BY HUGH MACCALLUM.

Read before the North British Branch of the Pharmaceutical Society.

There are three vermilion works in Hong Kong, the method of manufacture being exactly the same in each. The largest works consume about six thousand bottles of mercury annually, and it was in this one that the following operations were witnessed:

First Step.—A large, very thin iron pan, containing a weighed quantity, about 14 pounds, of sulphur, is placed over a slow fire, and two-thirds of a bottle of mercury added; as soon as the sulphur begins to melt the mixture is vigorously stirred with an iron stirrer until it assumes a black pulverulent appearance with some melted sulphur floating on the surface; it is then removed from the fire and the remainder of the bottle of mercury added, the whole well stirred. A little water is now poured over the mass, which rapidly cools it; the pan is immediately emptied, when it is again ready for the next batch. The whole operation does not last more than ten minutes. The resulting black powder is not a definite sulphide, as uncombined mercury can be seen throughout the whole mass; besides, the quantity of sulphur used is much in excess of the amount required to form mercuric sulphide.

Second Step.—The black powder obtained in the first step is placed in a semi-hemispherical iron pan, built in with brick, and having a fireplace beneath, covered over with broken pieces of porcelain. These are built up in a loose porous manner, so as to fill another semi-hemispherical iron pan, which is then placed over the fixed one and securely luted with clay, a large stone being placed on the top of it to assist in

keeping it in its place. The fire is then lighted and kept up for sixteen hours. The whole is then allowed to cool. When the top pan is removed the vermilion, together with the greater part of the broken porcelain, is attached to it in a coherent mass, which is easily separated into its component parts. The surfaces of the vermilion which were attached to the porcelain have a brownish-red and polished appearance, the broken surfaces being somewhat brighter and crystalline.

Third Step.—The sublimed mass obtained in the second step is pounded in a mortar to a coarse powder, and then ground with water between two stones, somewhat after the manner of grinding corn. The resulting semi-fluid mass is transferred to large vats of water, and allowed to settle, the supernatant water removed, and the sediment dried at a gentle heat; when dry, it is again powdered, passed through a sieve and is then fit for the market.—*Pharm. Jour. and Trans.*, December 17, 1881.

GLEANINGS IN MATERIA MEDICA.

BY THE EDITOR.

Amygdalus communis.—In a thesis recently presented to the California College of Pharmacy Martin J. Murphy states that almonds are grown in most parts of that State and that considerable loss was caused by frosts in districts unsuited to the culture. The almond tree does best in the coast mountain valleys in the central and southern parts of the State, where they are protected from the frosts and cold winds, and are supplied with atmospheric moisture. The variety best suited to the climate is the Languedoc, which is a late bloomer and thrifty grower. About one hundred trees are planted to the acre, yielding fruit when 3 years old of an average value of $50, 4 years $200, 5 years $500, 6 years $1,000, 7 years $1,500, 8 years $2,000, older trees bearing more fruit. The average price of sweet almonds is 14 cents, and of bitter almonds 10 cents per pound; the latter are not cultivated to any great extent in California. The bleaching process, employed for giving the almonds uniform appearance and for destroying insects, consists in burning sulphur upon trays on which the almonds are placed. In three experiments the author obtained from California bitter almonds 39·5, 34· and 32·7 per cent. of fixed oil (by expression?).

Heteromeles arbutifolia, J. Roemer, nat. ord. Rosaceæ, is known as

laurel hawthorn, the *toyou* or *tollou* of the Indians, and grows in the coast range of California. The leaves yielded to D. D. Lustig hydrocyanic acid, volatile oil, tannin, gallic acid, resins, fat, wax, gum, coloring matter and chlorophyll. The fruit is eaten by the Indians.—*Proc. Calif. Coll. Phar.*, 1882, p. 59.

Thevetia nereifolia.—Prof. C. I. H. Warden, of Calcutta, has isolated from the seeds of this plant a peculiar principle, *pseudoindican*, which with acids yields a blue coloring matter, thevetin blue. The seeds were deprived of oil, digested with alcohol, the thevetin separated by concentration and filtration, and the liquid agitated with chloroform. The solution of the chloroform extract was neutralized with sodium carbonate, precipitated with basic lead acetate, the filtrate freed from lead, concentrated, and the residue treated with warm amylic alcohol, which left extractive matter behind. Thus obtained pseudoindican contains a trace of thevetin, is noncrystalline, bright yellow, transparent, easily pulverizable, slightly hygroscopic, readily soluble in water, alcohol and methylic and amylic alcohols, neutral in reaction and of an unpleasant taste, free from bitterness and acidity. Aqueous solutions acquire immediately a bright blue color with concentrated hydrochloric acid, but with the dilute acid no change is produced until after the application of heat, when blue flocks are separated; the colorless filtrate gave marked indications of the presence of glucose.

Concentrated sulphuric acid produces in a dilute aqueous solution a yellow color, rapidly changing to green, then to blue, with separation of blue flocks, and on gently heating the color changes to a cherry red or rich purple. Solid pseudoindican is colored yellow by sulphuric acid; the color rapidly deepens, on heating changes to cherry red, and on largely diluting with water, to purple or blue with separation of reddish or bluish flocks.

Pseudoindican is colored yellow and oxydized by nitric acid, not altered by acetic acid, and yields a dirty greenish-blue color on being evaporated with phosphoric or tartaric acid.

The *thevetin-blue* after drying is a dark brownish or black amorphous powder, insoluble in water, soluble with a brown color in sulphuric acid, and this solution yields a blue precipitate with water. The bluish-green solution in hydrochloric acid, diluted with water, yields blue flocks on heating. The reddish-brown solutions in caustic alkalies yield blue precipitates with acids. Compared with Kuhl-

mann's cottonseed-blue (Gmelin's Handbook, xvi, p. 459) the following differences are observed:

	Cottonseed Blue.	Thevetin Blue.
Reducing agents,	Not altered,	Not altered.
Oxidizing agents,	Decomposed.	Decomposed.
Water,	Insoluble,	Insoluble.
Hydrochloric acid,	Insoluble,	Soluble.
Acetic acid,	Insoluble,	Soluble.
Phosphoric acid,	Insoluble,	Slightly soluble.
Sulphuric acid,	Soluble,	Soluble.
Aqueous alkalies,	Insoluble,	Soluble.

—*Phar. Jour. and Trans.*, Nov. 19, 1881, p. 417.

Fixed Oil and Poisonous Principle of Thevetia nereifolia.—Dr. J. E. de Vrij ascertained in 1863 that 1,500 grams of air dry seeds weighed after complete drying 1,378 grams, and these yielded by expression 490 grams, or 35·5 per cent. of fixed oil, which is limpid, almost colorless, of a mild taste, solidifies at 13°C., and, according to Oudemans (1866), consists of 63 per cent. olein and 37 per cent. palmitin with stearin. The presscake yielded 4 per cent. of white crystallized bitter *thevetin*, a glucoside which like its derivative theveresin is a narcotic poison. The chemical investigation was made by Dr. C. Blas in 1868, and published in "Bulletin de l'Acad. roy. de méd. de Belg." (3), ii, No. 9.—*Ibid.*, Dec. 3, p. 457.

Rhododendron occidentale.—Chas. M. Troppman found in the leaves an acid resin soluble in ether, resin soluble in alcohol, chlorophyll, fat, tannin, glucose, wax, albumen and pectin; neither arbutin nor volatile oil could be detected. Two grains of the alcoholic extract produced upon the author a burning sensation in the mouth and throat, continued cough, pain in the stomach, nausea and flushed countenance. Ten grains given to a dog induced vomiting and purging, and $7\frac{1}{2}$ grs. administered subcutaneously killed a rabbit in three hours.—*Proc. Calif. Coll. Phar.*, 1882, p. 58.

California Raisins.—We learn from exchange papers that during the past year 150,000 boxes of raisins have been put up in California.

Gentianose, $C_{36}H_{66}O_{31}$, is a saccharoid isolated by Arthur Meyer from gentian root, by adding $\frac{2}{3}$ volume of alcohol to the freshly expressed juice and then precipitating fractionally with ether. The last precipitates were free from gum, dissolved in boiling strong alcohol and the solution crystallized in an exsiccator over burned lime. When pure the crystals are scaly, white, of a scarcely sweet taste, readily soluble in water, fusible at 210°C., readily fermentable with yeast,

turn brown by sulphuric acid and do not reduce Fehling's solution; its specific rotation was $+65\cdot7°$ when dissolved by heat, and $+33\cdot36$ when dissolved cold. On treatment with dilute sulphuric acid an invert sugar was obtained, which fermented readily, rotated $-20\cdot2°$ at 18°C., reduced Fehling's solution like glucose, and could not be obtained in crystals.—*Zeitschr. f. Physiol. Chem.*, vi, No. 2.

Pinguicula vulgaris, Lin., popularly called butter-wort, according to Prof. Russow, contains crystalloids in the epidermis of the upper and more numerous of the lower surface of the leaves, in the epidermis of the peduncle, in the stipe cells of the glandular hairs and in the pointed hairs of the throat of the corolla. These crystalloids form quadrangular plates with sharp edges, are packed together like coin in rolls, and have a diameter of 4 micromillimeters. The rather copious secretion of albuminous crystals in the cells of the vegetative region may possibly have some relation to the well-known insectivorous properties of butterwort.—*Ph. Zeit. Russl.*, 1881, p. 891; *Sitz. Dorp. Naturf. Ges.*

The Olive tree was first planted in California in 1769 by the Spanish missionaries at San Diego, the variety being probably a wild one, as its fruit is smaller and not so abundant as the French and Italian varieties. Jerome J. B. Argenti, in a thesis to the California College of Pharmacy, states that the olive is now extensively cultivated in the southern and central portions of that State for the manufacture of the oil. From the comparison of meteorological tables the author finds the climate of Colfax to be similar to that of Rome, Sacramento to Naples, Los Angeles to Alexandria, Chico to Jerusalem, and thinks that the olive may be still more extensively grown in California. The tree thrives best in a dry calcareous and sandy soil, and can be propagated by seeds, slips, cuttings, suckers and from the small swellings or knots called *novoli* by the Italians. When the seed is used, the pulp of the fruit is removed, the stone is soaked in strong lye to soften it, and is then planted and occasionally watered, the seedling being transplanted when two or three years old.

Cotton-seed Oil contains a yellow unsaponifiable oily body, and its admixture with olive oil may, according to Roediger, be detected by saponifying the oil and treating the nearly dry soap with benzin, on the evaporation of which golden-yellow drops are left behind. This yellow oil causes the ugly yellow spots in soaps made with cotton-seed oil.—*Chem. Zeitung*, 1881, p. 623.

PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR.

The use of Quillain for emulsions was described by S. A. McDonnell in a paper read before the California College of Pharmacy, January 12, 1882. The name quillain is suggested for the dry aqueous extract of quillaia bark, as being short and expressive. The yield of the brownish colored extract, made by boiling, is from 20 to 25 per cent.; its taste is sweetish with an acrid aftertaste, and it is easily pulverizable and not hygroscopic; it may also be obtained in transparent scales by drying it on plates of glass, and though it may be obtained colorless by treatment with animal charcoal, this is not deemed necessary, since the brown extract will yield a very white emulsion. It dissolves quickly in water, and such a solution, agitated with twice its bulk of any fixed oil, very readily yields a perfectly homogeneous emulsion, which on standing for two or three days may show a partial separation of turbid watery liquid, this being intimately united again with the emulsified oil by gentle agitation. A non-separating, but much thicker, emulsion may be made by using quillain gr. ix, water ℥i and oil ℥ix. Emulsions containing quillain, but no sugar, have been kept on hand for a year without spoiling. The author gives the following practical formulas:

℞	Quillaini,	gr. ii
	Aquæ,	℥ii
	Olei Ricini,	℥ii Misce.
℞	Quillaini,	gr. iii
	Aq. Cinnamomi,	℥iiss
	Olei Ricini,	℥iii
	Glycerini (vel Syrupi),	℥ss

℞	Quillaini,	gr. iv
	Aquæ,	℥ii
	Olei Morrhuæ,	℥iv
	Syr. Hypophosphit.,	℥iii
	Olei Aurantii,	gtt. v Misce.
℞	Quillaini,	gr. i
	Aquae Gaultheriæ,	ʒvii
	Oleoresinæ Filicis,	ʒi Misce.

The ingredients are designated in the order in which they should be mixed. (See also paper by H. Collier in "Amer. Jour. Phar.," 1880, p. 41.)

Emulsion of Codliver oil with Hypophosphites.—F. Grazer proposes to prepare this with a tincture of quillaia made by digesting 4 oz. of the bark with 24 oz. of water and 8 oz. of alcohol. Two ounces of the tincture are heated to evaporate the alcohol, mixed with 2 oz. of glycerin and the necessary quantity of hypophosphites, when the mixture is beaten into a creamy state by means of an egg beater. Twelve ounces of codliver oil are next added in small quantities, being pro-

perly emulsified after each addition, and flavored with essential oil of almonds. The odor and taste of the oil is thus completely disguised. The emulsion is thick, requiring a wide mouth bottle, is permanent, a slight separation which may take place being easily remedied by a little agitation, and mixes in all proportions with water without separating any oil globules; it is easily made, palatable, and contains 75 per cent. of codliver oil.—*Proc. Calif. Coll. Phar.*, 1882, p. 31, 32.

Tooth Wash.—E. W. Runyon contributes the following formula:

Take of White oak bark,	2½ ounces.
Rhatany root,	½ ounce.
Sassafras bark,	1 drachm.
Red cinchona,	3 drachms.
Cardamom seeds,	30 grains.
Ceylon cinnamon,	20 grains.
Cloves,	30 grains.
Oil of wintergreen,	1 fluidrachm.
Oil of anise,	½ fluidrachm.
Alcohol,	20 fluidounces.
Water,	12 fluidounces.

The drugs are finely ground and macerated in the liquids for ten days; then filter.—*Ibid.*, p. 51.

Flour paste is made by thoroughly mixing flour 4 oz. with water 1 pint, straining through a sieve, adding nitric acid 40 minims, and heating until thoroughly cooked; when cold, 5 minims each of oil of cloves and carbolic acid are added. In the dry climate of California the addition of 5 per cent. of glycerin prevents the paste from drying up too soon.—*Ibid.*

EMULSIONS.

By C. Lewis Diehl.

Among the many preparations that manufacturers of pharmaceutic specialties have made much capital out of in recent years, emulsions of codliver oil take a very prominent place. From the claims set forth in their advertisements—which may be either by label, by circular, or by personal interview of the manufacturer's agent—one is easily led to believe that not alone superior knowledge and skill are requisite in their production, but also that their successful production is possible only with the aid of expensive machinery and the advantages that are derived from abundant capital and a particularly favored market. Yet nothing is further from the truth; for while it is not disputed

that a certain amount of knowledge and skill are required, that machinery is a necessity to the production of emulsions in large quantities, and that capital and a good market are advantageous in a commercial sense, their production requires no more knowledge and not as much skill as does the compounding of most of the prescriptions daily put up in our pharmacies, while all the apparatus necessary are a mortar and pestle and accurate implements of measurement. These, with good, fresh codliver oil—which can be obtained without difficulty—make the production of an emulsion as easy an operation as the compounding of the simplest prescription. Moreover, such emulsions possess real advantages over the manufactured article. They are, in the first place, perfect emulsions, which the commercial products in many cases are not. Then being prepared at the time when they are prescribed, they are absolutely fresh; and there is perhaps no class of preparations in which this is more desirable. It is true the manufacturers usually claim that their emulsions keep well; but at the same time they are very careful to recommend that such be kept in a cool place. The truth is that notwithstanding such care the preparations furnished soon undergo change, become unsightly and unfit for use; and if it is further considered that this care in their preservation cannot always be observed, and, as a rule, is disregarded both by the wholesaler and retailer, it cannot be wondered that manufactured emulsions are often dispensed in a very unfatisfactory condition.

These considerations have suggested to me the propriety of offering some formulas for emulsions, in the hope that in the absence of authoritative formulas physicians may find them of sufficient merit to adopt them in their practice; giving them at the same time the assurance that careful pharmacists following them will succeed as well as I have succeeded in preparing them.

The successful formation of emulsions, whether of fixed or volatile oils, is dependent upon certain rules, well understood by accomplished pharmacists, which when deviated from will invariably embarrass the operator, either by retarding or completely preventing perfect emulsification. These rules are:

1. That the water and gum arabic[1] shall be in definite and absolute

[1] The writer is well aware that other emulsifying agents have been proposed and are used, but he is satisfied that none of these answer as well as does gum arabic.

proportion to each other. This proportion is three (3) parts of water to two (2) parts of gum, both by weight.

2. That the relation of oil to gum (and water) shall be definite within certain limits; that is to say, the mucilage formed in the above proportions is capable of perfectly emulsifying a minimum and a maximum proportion of oil. The minimum proportion is two (2) parts of oil to one (1) part of gum; the maximum proportion is four (4) parts of oil to one (1) part of gum.

3. That the trituration of the oil, gum and water be continued till a perfectly homogeneous, milky-white, thick-creamy mixture is formed —*i. e.*, until perfect emulsification takes place—before the addition of a further quantity of water or other liquid.

The thick creamy emulsion obtained, if the above conditions are fulfilled, must be the basis of all perfect emulsions. It will bear dilution to any extent with water, forming mixtures varying, according to the proportion added, from the appearance and consistence of cream to that of very thin milk. Obviously the water may be substituted by solutions of saline compounds, syrups, etc., and this enables the production of the various combinations of codliver oil in current use from the above thick-creamy emulsion, which for distinction I shall designate as

I. *Concentrated Emulsion of Codliver Oil.* Take of fresh Norwegian codliver oil eight (8) troyounces; powdered gum arabic, two (2) troyouncee; distilled water, three (3) troyounces. First weigh the gum into a wedgewood or porcelain mortar, then the oil, and triturate till the gum is well mixed with the oil; then weigh into the mixture the distilled water, and triturate the whole briskly until the mixture thickens and acquires a pasty consistence and milky whiteness. Now scrape down the portions adhering to the sides of the mortar and to the pestle, and continue the trituration for a short time, after which add such other ingredients as may be desirable or transfer the concentrated emulsion to a wide-mouthed bottle for future use.

This concentrated emulsion will keep for a reasonable time in cold weather, and, if placed in the ice chest, also during warm weather. It may therefore be kept in stock if the demand for emulsions is brisk enough to justify it; but inasmuch as its preparation does not consume more than five or ten minutes, it is advised to always prepare it fresh, or, at all events, never to prepare more than a week's supply, particularly in summer. Its consistence is such that it is poured out of the

containing vessel with difficulty; hence the necessity of using one with a wide mouth, which should be as securely stoppered as possible, and should be cleaned very carefully each time it is refilled. All this takes time and involves trouble, which is prevented by preparing the concentrated emulsion only as required.

II. *Simple Emulsion of Codliver Oil.* Take of concentrated emulsion of codliver oil thirteen (13) troyounces; oil of wintergreen, twenty-four (24) drops; syrup, one (1) fluidounce; water, three (3) fluidounces. Weigh the concentrated emulsion into a mortar, add the oil of wintergreen, and triturate thoroughly; then gradually add first the water and then the syrup.

The manipulation for this emulsion is typical for all the other codliver oil emulsions given below. It has the consistence of very thick cream, but is readily poured out of narrow-mouthed bottles, is milky white, and mixes readily with water or other liquids that may be administered with it. It contains exactly fifty per cent. (by volume) of oil, the quantity that manufactured emulsions are said to contain, although I have convinced myself that some of them do not contain that proportion. The oil of wintergreen disguises the odor of the codliver oil very admirably, and has the further advantage that it acts as a preservative.

III. *Emulsion of Codliver Oil with Hypophosphite of Lime.* This differs from the simple emulsion in that one hundred and twenty-eight grains of hypophosphite of calcium are dissolved in the water, each tablespoonful of the finished emulsion containing four grains of that salt.

IV. *Emulsion of Codliver Oil with Hypophosphite of Lime and Soda.* This differs from the simple emulsion in that one hundred and twenty-eight grains of hypophosphite of calcium and ninety-six grains of hypophosphite of sodium are dissolved in the water, each tablespoonful of the finished emulsion containing four grains of the calcium and three grains of the sodium salt.

V. *Emulsion of Codliver Oil with Hypophosphites.* This differs from the simple emulsion in that one hundred and twenty-eight grains of hypophosphite of calcium, ninety-six grains hypoposphite of sodium, and sixty-four grains of hypophosphite of potassium are dissolved in the water; each tablespoonful containing four grains of the calcium, three grains of the sodium, and two grains of the potassium salt, and

corresponding to a teaspoonful of Churchill's syrup of the hypophosphites.

VI. *Emulsion of Codliver Oil with Phosphate of Lime.* This differs from the simple emulsion in that two hundred and fifty-six grains of phosphate of calcium are dissolved in the water by the aid of one hundred and twenty-eight grains of hydrochloric acid;[1] each tablespoonful containing eight grains of the phosphate held in pleasantly-acid solution.

VII. *Emulsion of Codliver Oil with Phosphate of Lime and Soda.*—This differs from the simple emulsion in that two hundred and fifty-six grains of phosphate of calcium and sixty-four grains of phosphate of sodium are dissolved in the water acidulated with one hundred and twenty-eight grains of hydrochloric acid; each tablespoonful containing eight grains of the calcium and two grains of the sodium salt.

VIII. *Emulsion of Codliver Oil with Lactophosphate of Lime.* This differs from the simple emulsion in that two hundred and fifty-six grains of lactate of calcium dissolved in two fluidounces of diluted phosphoric acid are substituted for two fluidounces of the water, each tablespoonful containing eight grains of lactate of lime or about ten grains of lactophosphate.

IX. *Emulsion of Codliver Oil with Wild-cherry Bark.* This differs from the simple emulsion in that the oil of wintergreen is replaced by eight drops of oil of bitter almonds, and in that one fluidounce of the fluid extract of wild-cherry bark is substituted for one fluidounce of the water; each tablespoonful containing fifteen minims of the fluid extract and one-fourth of a drop of oil of bitter almonds.

Other combinations of codliver oil with different medicinal agents may be effected in the same way as pointed out in the above, or the proportions of salts may be varied to suit particular cases. The process for the concentrated emulsion also may be applied to the emulsification of other oils, as, for instance, in the following:

X. *Emulsion of Castor Oil.* Take of castor oil four (4) troy ounces; powdered gum arabic, one (1) troyounce; distilled water, one and one half ($1\frac{1}{2}$) troyounce; syrup, cinnamon water, of each three (3) fluidounces; spirit of cinnamon, twelve (12) minims. Emulsify the oil with the gum and distilled water as directed under I, then add the

[1] The use of hydrochloric acid instead of phosphoric acid is preferred, because the large quantity of the latter required would make the preparation unpleasantly sour.

other ingredients successively with constant trituration. This emulsion contains thirty-three per cent. of castor oil, and is consequently more limpid than the fifty per cent. codliver oil emulsions above described, and is in every respect an elegant preparation.

Louisville.

PRESENCE OF PEPTONES IN PLANTS.

By E. Schulze and J. Barbieri.

As Gorup-Besanez has demonstrated the existence of albumin solvent ferments in the seeds and other parts of plants, the presence of peptones was to be expected; but experiments with a view of finding these substances have for the most part been unsatisfactory. On the one hand, Kern has found peptones in the extracts of fodder plants, lucerne, vetches, etc., but considers that they were formed during the preparation of the extracts. On the other hand, Kellner maintains that peptones are neither present nor are formed during the process of extraction, if sufficient care be taken. The authors have re-examined the question by the light which the researches of Hofmeister have thrown on the chemical nature and properties of peptones; they have also adopted the methods of separation ("Abstr.," 1879, 183) and the so-called biuret reaction (*i. e.*, red-violet coloration with copper sulphate in alkaline peptones) proposed by Hofmeister. This latter reaction forms a basis for a colorimetric determination of peptone, a number of solutions of standard tints being prepared by dissolving known weights of peptone (from blood fibrin), and adding to them known volumes of soda and copper sulphate solutions. In order to isolate peptone from vegetable extracts, the authors, adopting the method of Ritthausen, have treated the albuminous substance known as conglutin (obtained from lupines) with pepsin solution, and purified the product by the processes used for fibrin peptone. This preparation was not so pure as ordinary fibrin peptone, resembling the latter in its behavior towards tannin and phosphotungstic acid, but differing from it in giving a precipitate with acetic acid and potassium ferrocyanide. The coloration produced from the plant-extract with copper sulphate was of the same tint as that formed with the solution of fibrin peptone of strength 1 : 1,000. Similar results were obtained with other extracts, and the authors have thus demonstrated the existence of peptone in plant-buds, seeds, potatoes of various species, and in the

sap of beetroot, but in all cases in relatively small quantities. In many of the fodder grasses, no peptones were found, but an examination of young plants showed that there were present ferments which, in the course of the preparation of the extracts, acted on the albumins and converted them partly into peptones. Further it was shown that, using suitable methods of extraction, the formation of peptone can either be entirely prevented, or at least modified. An examination of lupine seeds revealed the presence of a substance intermediate between albumin and peptone, similar to the substance obtained by Vines "Abstr.," 1881, 1062, and named by him vegetable peptone. From its properties the authors consider that it cannot be classed as a peptone, but only as a transition substance, resembling the peptone of Schmidt Mülheim. As it was found that in many plant-extracts obtained from various sources, only a small fraction of the nitrogen constituents of the phosphotungstic acid precipitate arises from the peptone, it is probable that a more intimate examination of this precipitate would lead to the isolation of nitrogenous substances; and in an added note the authors suggest that these probably belong to the xanthin class, which have recently been found by Salomon in plant-seeds.—*Jour. Chem. Soc.*, March, 1882, from *Chem. Centr.*, 1881.

CHLOROPHYLL.

By B. Sachsse.

The amount of chlorophyll in plants is generally much underestimated. From 125 kilos. of fresh leaves the author has obtained no less than 100 grams of phyllocyanin, which he considers to be the principal constituent of chlorophyll. The numerous attempts which have been made to explain the reduction of carbonic anhydride by the green coloring matter of leaves have so far been without result, and the following hypothesis is, therefore, proposed: Chlorophyll is not the cause of the reduction of carbonic anhydride under simultaneous action of light and protoplasm, as is generally supposed, but is itself the first product of that reduction, the chlorophyll so formed being at once converted into starch and other carbohydrates, which have been usually considered to be the first products of the reduction, and its place supplied by more chlorophyll, resulting from a further reduction of carbonic anhydride. This hypothesis the author endeavors to

submit to the test of experiment by trying whether pure chlorophyll can be made to yield carbohydrates by the action of reducing agents, and more especially sodium. For this purpose a quantity of fresh leaves was treated with alcohol and benzin, according to a method for which the original paper must be consulted, by which means the alcohol takes up chiefly the yellow coloring matters which accompany the chlorophyll, whilst the latter is dissolved by the benzin.

A solution of chlorophyll in benzin was treated with sodium, when, after a lapse of 8 to 14 days, a cloudiness appeared, and gradually assumed the form of a voluminous green precipitate, whilst the supernatant liquid was no longer green but golden-yellow, owing to the presence of a yellow coloring matter (A), which will be subsequently referred to. The green precipitate was a dark green, almost black, mass, of soapy consistence, and was readily soluble in absolute alcohol, forming a brilliant green beautifully fluorescent liquid; it also dissolved in water, forming a similar solution, but less fluorescent. On adding the solution of a metallic salt, *e.g.*, copper sulphate, to the aqueous solution, a dark green voluminous precipitate of the copper salt is obtained, whilst there remains in the filtrate a colorless amorphous body, which has almost the composition of a carbohydrate, but containing rather more hydrogen, and is partially converted by the action of acids into a substance showing the most important reactions of a sugar of the dextrose group. On slightly acidifying the aqueous solution of the original green or fluorescent coloring matter with hydrochloric acid, or on passing in a current of carbonic anhydride, the liquid assumes a golden-green cloudy appearance, which, in the case of the hydrochloric acid, soon settles out as a distinct precipitate, whilst the colorless amorphous substance above referred to remains in solution. The principal constituent of the precipitate is an almost black coloring matter, to which the name phyllocyanin is given. Among the decomposition-products of the original green coloring matter by means of acids are two substances which belong to a class of yellow coloring matters to be subsequently referred to, and another which is of a fatty nature.

The author thinks that the original green fluorescing body is homogeneous, but of a very complicated composition. On analysis, it gave, as the extremes of several determinations: 60·96 to 61·88 per cent. C, 9·21 to 9·39 H, 1·99 N, 10·46 to 11·00 ash (which contained sodium, phosphoric acid and magnesium, but no iron).

Phyllocyanin, which really includes several different bodies of a very similar nature, is a dark green, almost black, mass, which is insoluble in water, only sparingly soluble in benzin, and however prepared, is always nitrogenous. It may be separated into three different substances by treatment with hot alcohol. These gave the following composition on analysis:

	C.	H.	N.
A. Insoluble in alcohol, . .	67·66–67·77	8·03–8·41	5·46–5·92
B. Difficultly soluble in alcohol, .	69·32–69·71	6·75–7·30	8·24–8·56
C. Easily soluble in alcohol, .	69·14-69·70	7·45–7·60	7·08–7·30

On oxidation with potassium permanganate in alkaline solution, phyllocyanin gives ammonia, oxalic, palmitic, and probably lactic, acetic, and three other acids, which appear to be nearly related to or identical with itaconic, citraconic, and mesaconic acids.

On dry distillation under diminished pressure, phyllocyanin gives palmitic aldehyd; whilst on dry distillation with lime it gives palmitone, $C_{31}H_{62}O$, or possibly stearin; on treatment with bromine in aqueous solution, it is decomposed into ammonia, and, at least, three other bodies, one of which is easily soluble in benzin; the second insoluble in benzin, but easily soluble in alcohol; and the third insoluble in either solvent.

In the solid state the yellow coloring matter A, referred to above, forms a mass varying in color from brown to yellow, or reddish yellow, of a fatty nature, always free from nitrogen, and varying in composition between 65·88 to 70·90 per cent. C, 7·91 to 9·80 H, and 26·21 to 19·30 per cent. O. Two other coloring matters of a pale yellow were also obtained, although it is very doubtful whether these latter were derived from the chlorophyll, or only admixed impurity; one of them had a composition represented by the formula $C_{26}H_{52}O_2$. The author considers the yellow coloring matter as the connecting link between the green coloring matters and the true fats, and is also of opinion that several modifications of chlorophyll exist, and that each chlorophyll contains a phyllocyanin, a yellow coloring matter, and a body nearly related to the carbohydrates.—*Jour. Chem. Soc.*, January, 1882, from *Chem. Centr.*, 1881.

MINUTES OF THE COLLEGE.

PHILADELPHIA, March 27, 1882.

The Annual Meeting of the Philadelphia College of Pharmacy was held this day at the Hall of the College, No. 145 North Tenth street. Dillwyn Parrish, President, occupied the chair, and 17 members were in attendance.

The minutes of the last meeting were read and, on motion, adopted.

In the absence of the Secretary of the Board of Trustees, Thomas S. Wiegand read the minutes of the Board during the last six months which were, on motion, approved.

These minutes inform the College that, at the recent commencement, 117 students had the degree of Graduate in Pharmacy conferred upon them, and that two of their number, Messrs. Virgil Coblentz, of Springfield, Ohio, and Jonas G. Clemmer, of Philadelphia, were each awarded a gold medal known as the "Procter Prize," for obtaining the highest average in all branches taught in the College.

Thomas S. Wiegand, Librarian, reported that "the theses and thirty volumes are in the hands of the binder. There have been added by purchase, since last report, 20 volumes."

The Curator's report was then read and, on motion, adopted.

"The Curator would respectfully report that several additions to the Cabinet have been made during the last year, probably the most valuable being the electrical apparatus presented by a graduate of this College—Frederick Gutekunst, Esq. The Pharmaceutical Meetings have been frequent occasions when additions have been made, and have undoubtedly been the cause of increasing the number of specimens to a very useful degree. With the enlarged space now afforded, it is hoped that during the coming summer cases may be furnished to complete the further arrangement of the accumulated specimens. Respectfully submitted,

"JOSEPH P. REMINGTON."

The following report of the Publishing Committee was then read and approved:

"PHILA., March 27, 1882.

"*To the Officers and Members of the Philadelphia College of Pharmacy:*

"Gentlemen.—The Publishing Committee respectfully report that the duties assigned them have been performed with care. The JOURNAL has been issued with its accustomed promptness and regularity, and in addition we have issued this year a decennial general index to Vol. 43, year 1871, to Vol. 52, year 1880, inclusive, a copy of which was sent to all regular subscribers of the JOURNAL without extra charge. The committee also decided to reduce the price of the general index to the first 42 volumes of the JOURNAL, from its commencement, Dec., 1825, to Nov., 1870, inclusive. The Editor's report will give in detail his work for the year.

"The committee deem an acknowledgment due to the Business Editor for his attention to the interests of the JOURNAL. His report is herewith submitted with the report of the Treasurer.

"HENRY N. RITTENHOUSE,

"*Chairman of Committee of Publication.*"

The report of the Editor was read and approved.

"*To the Philadeldhia College of Pharmacy:*

"During the past year eighty-seven original communications were published in the JOURNAL, which is the largest number during a series of years, with the exception of the years ending March 1876, 1877 and 1878. The number stated does not include several communications incorporated with the minutes of the Pharmaceutical meetings, nor the editorials, reports of meetings, original translations, gleanings and other abstracts from various —mainly foreign—sources furnished for the JOURNAL by Professors Sadtler and Power and by the Editor. The original papers were devoted to materia medica 38, chemistry 8, pharmacy 34 and 4 to other subjects of general interest, and embraced the investigations contained in 33 theses received by the College last year. The number of authors was 66, of whom three, who are members of the College, contributed respectively 9, 8 and 5 papers. Besides the contributions of these three members, there were published such from two honorary members and further eight papers by seven active members of the College.

"Although three-fifths of the original contributions to the JOURNAL emanated from members of the College, it is the belief of the Editor that a larger number of the members could report their observations, and he would again suggest that, whenever possible, such communications be made at the Pharmaceutical Meetings which are held monthly during eight months of the year. He would also repeat his recommendation made last year, of taking steps for stimulating original research at the laboratories of the College, and would suggest that the reports of the Pharmaceutical Meetings be extended so as to embrace in substance the remarks made on the various subjects coming up for discussion, for which purpose perhaps the employment of a short-hand reporter would be desirable.

"The Editor embraces this opportunity of thanking all friends of the JOURNAL, more especially those who have aided him with contributions and otherwise. Respectfully submitted, JOHN M. MAISCH, *Editor.*"

Charles Bullock, Treasurer of the Publication Committee, read the financial statement for the last year, exibiting the usual balance in his hands and showing that the committee has been engaged in a good work for the College. The Business Editor's account was also produced and appreciated for its proficiency and correctness.

The resignations of Jacob K. Hecker and G. Henry Kille, as members of the College, were read and accepted, and the Secretary was directed to request a return of their certificates of membership.

The Treasurer of the College reported the names of three members who are five years in arrears to the College. On motion, the Secretary was requested to inform them that, unless the arrears were wholly or in part paid before the next meeting of the College in June, their names will be dropped from the roll.

Charles Bullock, Chairman of the Committee on Deceased Members, alluded to the death of Dr. Robert Bridges, and stated that the matter would claim the attention of the Committee at an early day. He also referred to the death of Thomas P. James, formerly a member of the College, who died in Cambridge, Mass., on the 22d of February last, an obituary notice of whom will be found in the March number of the JOURNAL.

Professor Maisch, alluding to his report as Editor, called the special attention of the meeting to the importance of the Pharmaceutical Meetings, which he said had not been attended during the past season as well as formerly, and greatly regretted the lack of interest which members

apparently manifested therein. Students, who formerly attended these meetings, were not on hand to any extent during the past winter, and a general want of interest was apparent.

To awaken a new interest in these meetings during the coming fall and winter is very desirable, and an invitation to attend the Pharmaceutical Meetings is hereby extended to the members of the College and to all Druggists, and chemical and pharmaceutical students.

Exhibitions of new drugs and chemical products are solicited, with such remarks upon them as will throw light upon their origin or manufacture; observations upon combinations and incompatible mixtures at the prescription counter; new means of exposing adulterations, and new methods of preparing pharmaceutical preparations, would be desirable and instructive, and be the means of creating a new interest in these meetings.

Parties desiring to call attention to any subject will confer a favor by notifying the Registrar beforehand, so that notice may be given to members, in order that they may come prepared to discuss the subject.

On motion of Mr. Bullock, the chair appointed Professors Maisch, Remington, Power, Henry Trimble and Dr. A. W. Miller a committee to reorganize the Pharmaceutical Meetings in the coming fall, and to devise plans by which subjects will be chosen for discussion or investigation, papers written and read before the meeting, and such other matters as shall seem to them suitable for increasing the interest and attendance of the meetings.

This being the Annual Meeting, an election for Officers, Trustees and the Standing Committees was ordered.

The chair appointed Messrs. Henry Trimble and Charles A. Weidemann tellers, who, upon taking the ballot, reported the election of the following gentlemen:

President.—Dillwyn Parrish

1*st Vice President.*—Charles Bullock.

2*d Vice President.*—Robert Shoemaker.

Treasurer.—Samuel S. Bunting.

Recording Secretary.—William J. Jenks.

Corresponding Secretary.—Alfred B. Taylor.

Board of Trustees (*for three years*).—William B. Webb, Thomas S. Wiegand, Andrew Blair.

Publication Committee.—John M. Maisch, Henry N. Rittenhouse, Thomas S. Wiegand, James T. Shinn, Charles Bullock.

Sinking Fund Committee.—Thomas S. Wiegand, T. Morris Perot, James T. Shinn.

Editor.—John M. Maisch.

Librarian.—Thomas S. Wiegand.

Curator.—Joseph P. Remington.

No further business being offered, adjourned.

WILLIAM J. JENKS, *Secretary.*

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, March 21, 1882.

In the absence of the President Mr. Wm. J. Jenks was called to the chair. The minutes of the last pharmaceutical meeting were read and approved.

Prof. Power read a paper upon homatropine (see page 145). In answer to a question as to what extent homatropine was at present used in medicine, Dr. Wolff stated that it had not by any means supplanted the older remedy, atropine.

Prof. Maisch, on behalf of the British Pharmaceutical Conference, presented a copy of the Year Book of Pharmacy for 1881, and, from the Pharmaceutical Society of Great Britain, a copy of the Calendar of their Society for the year 1882.

Prof. Maisch exhibited specimens of a now quite rare drug, namely, the American *Castor, with oil sacks* attached thereto; these were much fresher than the drug as usually seen in the market, and had a strong castor and smoky odor, the sacks having been partially dried in the smoke. They had been sent by Mr. C. R. Lange, of Scribner, Neb., a graduate of the College.

A query was put as to whether any present were familiar with *chlorinated oil.* In reply Dr. Wolff stated that he had prepared it by passing dry chlorine gas into olive oil, and that, to his surprise, the gas was absorbed to a large amount; that there was a very considerable rise in the temperature of the oil, but there was no acid reaction nor smell of chlorine upon the oil. This chlorinated oil has been used quite successfully in cutaneous affections. Prof. Maisch suggested that an acid reaction would probably be observed on washing the oil with water; at least Lefort had, in 1852, obtained chlorine substitution compounds by treating fats with moist chlorine. Prof. Sadtler stated that he had prepared such substitution compounds of the fatty acids, and that soaps could be made with such acids.

Mr. Trimble called the attention of the meeting to an adulteration which was new to him, viz., that of *extract of liquorice* with extract of logwood; he had endeavored to get a sample of the sophisticated article, but so far had been unable to do so. Mr. Brown stated that he had lately seen an article of powdered extract of liquorice, which, upon attempting to dissolve for the purpose of making brown mixture, proved to be refractory, and examination showed it to be largely contaminated with wheat starch; the article was represented to be of German origin. Prof. Maisch considered this latter statement doubtful, since in that country starch was largely prepared from potatoes, and this was doubtless cheaper there than wheat starch.

Prof. Sadtler presented a copy of a table of the *scales of Baume's hydrometer,* the results of some very careful examinations into the original papers upon the subjects, made by Prof. C. F. Chandler and one of his assistants; and also a table of the valuations of *sulphuric acid* of different degrees of the hydrometer scale.

There being no further business, a motion to adjourn was made and carried.

T. S. WIEGAND, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

PHILADELPHIA COLLEGE OF PHARMACY.—The examination of the *Junior* students was held on the afternoon and evening of February 14th. The specimens for examination and recognition were as follows:

Matricaria,	Aqua fœniculi,	Acidum nitro-muriaticum,
Sabbatia,	Syrupus zingiberis,	Acidum phosphoricum dilut.,
Chondrus,	Extract. sennæ fluidum,	Potassii chloras,
	Sodii boras.	

The questions for written answers were the following:

CHEMISTRY.

1. Is the white light of the Sun simple or compound? How many elementary colors are there! What is Spectrum Analysis, and how do chemists utilize it?

2. What is the Electric Light? Give the difference between the "arc light" and the "incandescent light." Which is the more powerful?

3. Write three reactions for the production of Hydrogen.

4. What is Ozone? How is it produced, and what are the tests for it?

5. Give the chemical reaction by which Nitric Acid is made. What is the action of Nitric Acid upon vegetable or animal tissue? What are Nitrates used for in the arts?

BOTANY AND MATERIA MEDICA.

1. Explain the nature of *Cork Cells.* What is the difference between primary and secondary Cork? In what parts of plants is Cork produced?

2. In what respects does a *root* differ from a *rhizome*, both morphologically and in structure?

3. What are the medicinal properties of the plants belonging to the natural order of *Araceæ?* Name some drugs obtained from this natural order.

4. Give the botanical characters of the natural order of *Gentianaceæ.* Name the officinal herbs obtained from this order. State the medicinal properties of these plants.

5. *Spearmint* and *Peppermint.* Give the botanical names of the plants, and describe both plants, pointing out more particularly in what respects they differ.

PHARMACY.

1. If a *liter* flask holds forty-five and two-thirds *troyounces* of an officinal liquid at 4°C., what should you say the liquid was? Show the calculation for obtaining your answer.

2. Describe a *Hydrometer* suitable for pharmaceutical purposes. What is the theory of its construction? At which end of a hydrometer for heavy liquids is the specific gravity of water indicated? Why is it placed at this end?

3. Define *Fluid Extract*, *Syrup*, *Tincture*, *Infusion*, *Medicated Water.*

4. Define *Maceration*, and name three preparations wherein this process would be preferably used to percolation, and give your reasons for preferring maceration. Define *Percolation*, and name six preparations in which this process would be preferably used to maceration.

5. State briefly how officinal *Diluted Phosphoric Acid* is prepared. What do you know about an improvement over the officinal process? How is this preparation distinguished from other varieties of the same acid?

QUESTIONS BY THE COMMITTEE.

1. In what respect does the *United States Pharmacopœia* differ from a *Dispensatory?* What is meant by the Officinal name of a drug? Give an example. What is meant by the Botanical name of a drug? Give an

example. What is meant by the Common name of a drug? Give an example.

2. Give the Symbolic formulæ of the five compounds of Nitrogen and Oxygen. Give the physical characteristics and Specific Gravity of the officinal Nitrogen Acid. State briefly its method of manufacture.

3. What are the physical laws governing the evaporation of liquids?

4. Give the Botanical name and Natural order of the plant which yields the officinal *Levant Wormseed.* Give the Botanical name and Natural order of the plant which furnishes the officinal *Wormseed.* State how you would distinguish one of these drugs from the other.

At the practical examination the folding of plain and plaited filters for different funnels was practised, and percolation was started for preparing extract of gentian.

Those students who failed in one or more branches may come up for re-examination in the branches in which they were unsuccessful on the afternoon of Friday, September 29th, at 3 o'clock, when also others will be examined under the rules of the College prior to entering the senior class.

The examination of the students of the *Senior* class commenced on Tuesday, February 28th, and ended on Friday, March 3d, with the examination in practical pharmacy and in the questions propounded by the committee. The questions in the different branches were as follows:

QUESTIONS IN MATERIA MEDICA.

A. Name the *officinal roots* obtained from the natural order of *Umbelliferœ*, and give of each the plant producing it and its habitat. Describe each root briefly, and point out its structural characteristics. Name its important medicinal principles, and give its medical properties and dose.

B. Name the plants, with their habitat, yielding the *officinal rhizomes* of *Iridaceœ*. Describe the growth of the rhizomes, the place from which overground stems are produced, the arrangement of the leaf scars, and the position of the rootlets. Describe the drugs briefly, showing in what respects they differ, and give their medical properties and dose.

C. What is *Bittersweet?* Name the plant from which it is obtained, its habitat and natural order. When should it be collected? Describe the drug and name its constituents, its medical properties and its dose.

D. Name the plants yielding the officinal *barks of dogwood*, and give the natural order and habitat. Describe the barks as to their characteristic differences. Name the important principles, and give the medical properties and dose.

E. Give the name, natural order, habitat and officinal part of *foxgloxe.* When should the drug be collected? Describe it and give an outline of the process for obtaining the medicinal principle. What is the dose of the drug and of the active principle?

F. Give the name, natural order and habitat of the plant yielding *Purging Cassia.* Describe the drug, explain the cause of its division into cells, and state which portion and what percentage of the drug is medicinally employed. Give the origin and characteristic differences of other purging cassias sometimes met with in place of the officinal article.

G. Larkspur Seed. Give the name, natural order and habitat of the plant. Describe the drug and state its medicinal properties. What other drug is sold in its place? From what plant is this derived, and how may it be distinguished from the drug recognized by the Pharmacopœia?

H. What are the officinal *Nutgalls?* Upon what plant, by what insect, and in what country are they produced? Describe the different layers of tissue, and name the chief constituent of each layer. What causes the light color of white nutgalls? What amount of tannin is contained in

good nutgalls, and what is the chemical relation of this principle to gallic acid?

I. Which officinal *fixed oils* are obtained from *euphorbiaceous seeds?* In which tissue is the oil contained, and what is the shape and position of the embryo? What percentage of oil may be obtained from each seed, and what is the behavior of these oils to nitrous acid and to alcohol?

K. Give the officinal name of *Isinglass*, the name, class, habitat and part of the animal yielding it, and the manner in which it is prepared for the market. Describe briefly its charactesistic properties and its behavior to solvents.

QUESTIONS IN PHARMACY.

A. Write the answers to the following in the blanks provided for the purpose, showing the method of obtaining the results: 1. How many grains are there in a liter of officinal Hydrochloric Acid at 4°C.? 2. In one hundred centigrams of Chalk? 3. In an imperial pint of Glycerin? 4. In a troyounce of officinal Alcohol? 5. In a theoretical teaspoonful of syrup?

B. Give the unabbreviated officinal names, ingredients, outlines of process, and describe an improvement upon the officinal method of making the following: Citrine Ointment, Fluid Extract of Ipecac, Benzoated Ointment, Tincture of Kino, Syrup of Seneka.

C. Give the unabbreviated officinal names, and the equivalent metric weights of the ingredients in the following officinal preparations: Compound Spirit of Ether, Dover's Powder, Compound Cathartic Pills.

D. Give the ingredients and English names for Acetum Scillæ, Acidum Sulphuricum Aromaticum, Ceratum Cetacei, Collodium cum Cantharide, Confectio Rosæ, Infusum Gentianæ Compositum, Liquor Arsenici et Hydrargyri Iodidi, Pilulæ Aloes et Mastiches, Liquor Iodinii Compositus, Syrupus Rhei Aromaticus.

E. Give the tests for recognizing Morphia, Meconic Acid, Veratria, Brucia, the Aloins.

F. Give the process for making Saccharated Pepsin, Extract of Malt and Glucose, and state how the quality of each may be judged.

G. Give the process, specific gravity and tests of purity and identity of the following: Commercial Chloroform, Stronger Ether and Creasote.

H. Name the principle which is frequently found in fleshy roots, and which is the cause of gelatinous precipitates in some pharmaceutical preparations. Does this principle exist in unripe fruits? How may it be produced? How may it be destroyed? Name an officinal preparation in which the principle is very often seen.

I. What is the process usually employed in producing Oil of Gaultheria? What action have the Caustic Alkalies upon the Oil? What Acid does the Oil contain? Can it be produced artificially? Give the process and a test for the Acid.

K. What is the theory of Emulsification? Describe a natural emulsion and illustrate. Give three practical formulas illustrating three different methods of preparing emulsions. State the circumstances under which it would be best to use each method.

QUESTIONS IN CHEMISTRY.

A. What is the *Leblanc Soda Process?* Write the chemical actions involved in this process. What are the side-products of the process?

B. Give the chemical formula for crystallized *Sodii Boras.* How is it affected by heat? Mention its uses in Pharmacy and in the Arts.

C. How is *Calcii Phosphas Præcipitata* prepared? Write the reactions involved. What are the impurities removed by this process of preparation?

D. State the method of preparation and the pharmaceutical uses of *Ferri Oxidum Hydratum.* Exhibit by chemical formulas the changes which it undergoes on keeping. State, also, the chemical difference between *Ferri Carbonas Saccharata* and *Ferri Subcarbonas.*

E. Enumerate the tests for *Arsenic*, explaining the chemical reaction in each case. How many of these are applicable to *Antimony* also? When applicable to both metals, state how we may distinguish one metal from the other in the results of the test.

F. Write the chemical formula of *Plumbi Acetas*, of the Salt present in *Liquor Plumbi Subacetatis*, of *Plumbi Carbonas*, and of *Emplastrum Plumbi.*

G. What is meant by *Monatomic Alcohols?* How are they related to the series of organic acids known as "Fatty Acids?" What is the organic salt of a fatty acid known as? Give an example, naming the compound.

H. Give the chemical formulas for *Glucose* and for *Cane-Sugar*. Mention the points of difference, both physical and chemical, between them. Mention the tests by which admixture of Glucose with Cane-Sugar can be detected.

I. What is the chemical formula of *Acidum Benzoicum?* Give the sources of preparation of this acid, both natural and artificial. What is the chemical relationship of this acid with *Oleum Amygdalæ Amaræ?*

K. From what material is *Acidum Salicylicum* made exclusively at present? Write the chemical reaction for this process. Mention the characteristic tests for this acid. To what class of organic compounds does it belong?

QUESTIONS BY THE EXAMINING COMMITTEE.

A. Give the botanical name and natural order of the plant from which Cane-Sugar is chiefly obtained. From what other plant is it largely obtained in Europe? Give its chemical formula and molecular weight. What action has its solution on polarized light? How does this action indicate the amount of sugar present? How is the grape sugar of commerce prepared from starch? How would you detect chemically the adulteration of cane sugar with grape sugar? How is Caramel prepared?

B. What is the officinal name of Lime Water? Write the officinal formula for its preparation. Write out the reaction which takes place in the process, in words or symbols. State what precaution is necessary for its preservation. What quantity of lime is held in solution in a pint of water at 60°F.? Is lime more soluble in *hot* or in *cold* water? What effect is produced upon Lime Water by exposure to the air? Into what officinal preparation does Lime Water enter? Write out the formula for making this preparation.

C. Give the *officinal title* of the following drugs of animal origin, also the *Common* and *Scientific names* of the animals from which they are obtained. What *part* of the animal is directed by the United States Pharmacopœia to be used? Musk, Isinglass, Cantharides, Codliver Oil, Spermaceti.

D. Give the botanical name, natural order and habitat of the plant which yields the officinal *Benzoin.* Describe the method pursued in obtaining it. What appearance does the drug present in commerce? To what class of substances does it belong? What officinal chemical product is obtained from it? Describe the mode of obtaining this product. Into what officinal preparation does this product enter? State another source from which a similar chemical product is obtained.

E. Give the officinal name and active principles of the following drugs; also, the botanical name, natural order and habitat of the plants which furnish them: Elaterium, May Apple, Nux Vomica, Jalap, Aconite Root.

F. Give the *officinal name*, and write out the *formula*, *mode of preparation* and *dose* of the following, viz.: Tincture of American Hellebore, Spirit of Mindererus, Fowler's Solution, Dover's Powder, Antimonial Wine.

G. What is the officinal name of Hydrocyanic Acid? Give the officinal formula for its preparation. Give the officinal formula for preparing it when wanted for immediate use. Write out the reaction which takes place during the latter process. What per cent. of Anhydrous Acid does

the officinal solution contain? Give a test for Hydrocyanic Acid in solution. What directions are given for its preservation? What is the dose of the officinal acid?

H. Write the officinal name and formula of each of the following liquid preparations of *Opium*, and give the *dose* of each, viz: Laudanum, Black Drop, Paregoric Elixir, Wine of Opium, Acetated Tincture of Opium.

I and *K*.

Write out a direction for preparing this prescription: Would you dispense it?

1.

℞ Arsenici Iodidi, . gr. xxxv
Hydrargyri Iodidi Rubri, . . . gr. xxxv
Aquæ Destillatæ, f℥viii
Fiat Solutio.
Signa. A teaspoonful to be taken every two hours.

Criticise this prescription:

2.

℞ Hydr. Chlor., . . ʒi
Camphor. Monobrom., gr. xx
Elixir Calisayæ, . f℥ii
Misce et Signa. A teaspoonful as directed.

Name the order in which the ingredients of this prescription should be added to produce at once a clear solution.

3.

℞ Acidi Acetici diluti, . f℥iv
Ammonii Carbonatis, q.s.
Acidi Acetici, fʒi
Tincturæ Ferri Chloridi, f℥ss
Glycerinæ, . . . f℥ss
Mucilaginis Acaciæ, ad f℥viii
Fiat Mistura.
Signa. A teaspoonful every three hours.

Criticise this prescription. Would you dispense it?

4.

℞ Acidi Hydrocyanici diluti, ♏xl
Syrupi Tolutani, . f℥ii
Misce. Signa. Take a tablespoonful every four hours.

Criticise this prescription. Would you dispense it?

5.

℞ Acidi Arseniosi, . gr. iii
Pulveris Opii, . gr. iii
Confectionis Rosæ, q.s. ut fiat massa, in pilulas No. xxx dividenda.
Signa. Take one pill three times a day.

Criticise this prescription.

6.

℞ Syrupi Ferri Iodidi, f℥iss
Potassii Iodidi, . ʒi
Potassii Carbonatis, . ʒiss
Syrupi Tolutani, . f℥iss
Aquæ, . . . f℥ii
Misce. Signa. Take a spoonful four times a day.

The following specimens had been selected for recognition:

Materia Medica.	Pharmacy.	Chemistry.	Examining Committee.
Belladonnæ Radix,	Aqua Foeniculi,	Aqua destillata,	Calumba,
Helleborus,	Infusum Quassiæ,	Patassii nitras,	Valeriana,
Hydrastis,	Glyceritum Aciditannici,	Sodii carbonas,	Cubeba,
Gossypii Radic. Cort.,	Liq. Ammonii Acetacis,	Sodii bicarbonas,	Benzoinum,
Cetraria,	Pulv. Ipecacuanhæ comp,	Ferri Sulphas exsicc.,	Kino,
Chenopodium,	Confectio Sennæ,	Hydrarg. chlorid. mite,	Tinct. Opii camphor.,
Sinapis Alba,	Tinct. Opii deodorata,	Potassi ferocyanidum,	Ceratum Resinæ,
Ergota,	Extr. Sarsapar. fluid.,	Acidum oxalicum,	Liq. Plumbi subacet.,
Sago,	Pyroxylon,	Acidum tannicum,	Ammonii chloridum,
Ammoniacum.	Ferri Oxidum hydratum.	Oleum terebinthinæ.	Sodii boras.

The practical work consisted in the preparation, by each student, of syrupus ferri iodidi, unguentum hydrargyri, an emulsion containing 50 per cent. of codliver oil, suppositories containing tannin and extract of stramonium, and of a soap plaster 4 x 6 spread on paper.

The following 117 gentlemen passed the examinations and were recommended to the Board of Trustees for the degree of Graduate in Pharmacy:

Charles Niskey Acker, Pennsylvania, *Elixiria.*
James Addison Barkhuff, New York, *Laboratory of a Pharmacist.*
Albert Christian Behringer, Pennsylvania, *Ferri et Ammonii Citras.*

John Pemberton Binns, Pennsylvania, *Pharmacy.*
Wellington Henry Bird, Pennsylvania, *Coating of Pills.*
Cyrus Maxwell Boger, Jr., Pennsylvania, *Fluorescence.*
Charles Henry Bohn, Ohio, *Saccharum.*
Collier Levis Bower, Pennsylvania, *Brandied Tinctures.*
John Marion Bradford, Pennsylvania, *Fraxinus Americana.*
Charles Edward Buck, Maine, *Bismuthi Subnitras.*
John Albert Bush, Illinois, *Ointments.*
Huizinga Clarence Byers, Pennsylvania, *Manufacture of Wine.*
Chambers Brown Clapp, Ohio, *Prunus Virginiana.*
Jacob Miller Clark, Pennsylvania, *Glucose.*
Jonas Gerhard Clemmer, Pennsylvania, *Liquor Potassæ.*
Virgil Coblentz, Ohio, *Ipomœa Jalapa.*
Isaac Cohen, Pennsylvania, *Incompatibility of Medicines.*
Richard Frazier Collins, Ohio, *Jamaica Dogwood.*
Wm. Moore Guilford Corrie, Pennsylvania, *Glycerin.*
Edmund Austin Crenshaw, Jr., Pennsylvania, *Mediocrity in Pharmacy.*
Benjamin Amos Cunningham, Maryland, *Ext. Pruni Virginianæ Fluid.*
Charles William Dare, Pennsylvania, *Æther.*
Charles William DeFrehn, Pennsylvania, *Rhus Glabrum.*
Chas. August Theodore Doench, Germany, *Resin of Scammony.*
James Edgar Drorbaugh, Pennsylvania, *Syrups by Percolation.*
Walter Crull Dugan, Pennsylvania, *Glucose.*
Howard Mell Edwards, Georgia, *American Ash Bark.*
William Edgar Finney, Pennsylvania, *Ethics of Dispensing.*
John Davies Forbes, New York, *Doryphora Decemlineata.*
Charles McClellan Forney, Pennsylvania, *Iodine Pentabromide.*
William Otterbein Frailey, Pennsylvania, *Drugs used as Diet for the Sick.*
Walter Seip Freeman, Pennsylvania, *Petroline in Ointments.*
Samuel Harrison French, Pennsylvania, *Pepsin and its Digestive Test.*
Joseph Mellan Fronefield, Jr., Pennsylvania, *Pharmaceutic Preparations.*
Frank Geddis, Pennsylvania, *Quillaia.*
Jacob Franklin D. Geiger, Pennsylvania, *New Base for Suppositories.*
Orton Harris Gentry, Missouri, *Preparation of Syrups.*
George Washington Goldsmith, Pennsylvania, *Scilla Maritima.*
Howard Lee Green, Pennsylvania, *Osmorrhiza Longistylis.*
John Ellsworth Gregory, Pennsylvania, *Resina Podophylli.*
John Henry Harmonson, Virginia, *Stillingia Sylvatica.*
Oscar Eugene Harris, Pennsylvania, *Pharmacist and Physician.*
George Washington Hayes, Pennsylvania, *Commercial Powd. Rhubarb.*
Robert G. H. Hayes, Pennsylvania, *Syrupus Ipecacuanhæ.*
Emil Moses Herwig, Pennsylvania, *Preparation of Iodide of Iron.*
Joseph Herbert Hulme, New Jersey, *Commercial Powd. Opium.*
Frederick Jacob Knaus, Pennsylvania, *Alcohol.*
Harry Howard Kneedler, Pennsylvania, *Oleic Acid and the Oleates.*
Jacob Hamilton Knouse, Pennsylvania, *Commercial Aqua Ammoniæ.*
Emil John Kohl, Illinois, *Mixtures or Emulsions.*
Newton Alexander Koser, Pennsylvania, *Botany.*
Charles Frederick Kramer, Pennsylvania, *Gelatin Test of Astringent Drugs.*
Fred. Balthaser Krell, Pennsylvania, *Erythroxylon Coca.*
Walter Harry Kremer, Pennsylvania, *Cimcifuga Racemosa.*
John Albert Lambert, Indiana, *Ammonii Iodidum.*
Oscar F. Letoriere, Maryland, *Carbolic Acid.*
Josiah Kirby Lilly, Indiana, *Aralia Spinosa.*
David Christopher Lyman, Kentucky, *Advance of Science.*
Alexander McAlister, New Jersey, *Extractum Carnis*
Robert Davis McDougal, Illinois, *Dilute Phosphoric Acid.*
Samuel Harbeson McGowan, Pennsylvania, *Radix Taraxaci.*
Henry Conrad Mannel, New York, *Hints on Prescriptions.*

Franklin Augustus Matthes, Pennsylvania, *Primitive compared to Modern Pharmacy.*
W. Leaming Matthews, Pennsylvania, *Pharmaceutical Preparations.*
William Harry May, New Jersey, *Prescriptions.*
William Henry Mehl, Kansas, *Adulteration of Cream Tartar.*
James Honey Mercer, Ohio, *Acidum Tartaricum.*
Evan B. Merriam, New York, *Emulsion of Codliver Oil.*
Aaron Gable Miller, Pennsylvania, *Syrups by Cold Percolation.*
John Knox Miller, Ohio, *Oils and Fats.*
Lucius Wright Moody, New York, *Boracic Acid.*
William John Morton, Pennsylvania, *Emulsions.*
Edward Joseph Muldoon, Pennsylvania, *Opium.*
Alfred Mullhaupt, Pennsylvania, *Eriodictyon Californicum.*
John Henry Murray, Pennsylvania, *Palatable Medicines.*
William Gilmore Nixon, Pennsylvania, *Microscope in Pharmacy.*
George Leonard Ott, Delaware, *Eupatorium Perfoliatum.*
William Franklin Potteiger, Pennsylvania, *Acidum Sulphuricum Aromaticum.*
Edward Samuel Power, Maryland, *Cinchona Bark.*
John Abram Price, New York, *Purified Chinoidine.*
Ross Rambo, Pennsylvania, *Eucalyptus Globulus.*
George Prentice Raser, Pennsylvania, *Chemical Research.*
Gustav Adolph Renz, Minnesota, *Estimation of Alkaline Iodides.*
Theodore William Reuting, Pennsylvania, *Petroleum.*
William Davis Reynolds, Pennsylvania, *Habitual Use of Narcotics.*
Charles Naphtel Riggs, Ohio, *Detection of Alcohol in Essential Oils.*
William Ernest Roeschel, Missouri, *Chemical Urinalysis.*
William Robinson Ross, Pennsylvania, *Aspidosperma Quebracho.*
George Matthias Schambs, Ohio, *Benzoate of Calcium.*
Frederick Charles Scheible, Alabama, *Morphiometric Strength of Opium.*
Samuel Edward Schweitzer, Pennsylvania, *Toxicology.*
Charles August Schoenenberger, Pennsylvania, *Oil of Bitter Almonds.*
Frederick Seitz, Pennsylvania, *Mercury.*
John George Seitz, Ohio, *Dilute Phosphoric Acid.*
George Whitefield Sellers, Ohio, *Syrups by the Cold Process.*
Benjamin Franklin Sholl, Pennsylvania, *Comparative Value of Benzoin and Storax.*
Judson Stewart Smith, Pennsylvania, *Soluble Hypodermic Tablets.*
Eugene Abraham Stahler, Pennsylvania, *Podophyllum.*
Harry Reader Stallman, Pennsylvania, *Celery Seed.*
Frederick William Edward Stedem, Ohio, *Value of Cinchona Bark.*
Harry Ehrhart Steinhilber, Iowa, *Model Pharmacy.*
William Denny Stevenson, Delaware, *Preparation of Citrate of Iron.*
Cornelius Whitenach Stryker, Pennsylvania, *Glucose from Cassava.*
Walter Scott Swayne, Pennsylvania, *Pharmaceutical Science.*
William Montelius Swentzell, Illinois, *Fermentation.*
Daniel Judson Thomas, Pennsylvania, *Administration of Liquid Medicines.*
Oscar Ernest Thomas, Virginia, *Water.*
Herman Emanuel Thoms, Indiana, *Phosphorus and its Therapeutic Value.*
Paul Charles H. Wallschlager, Wisconsin, *Simaruba Excelsa.*
Edwin Connor Warg, Pennsylvania, *Hydrobromic Acid.*
Julius Way, New Jersey, *Commercial Bromide of Potassium.*
Henry Webster, Illinois, *Salicylate of Cinchonidia.*
George Edward Wevill, Pennsylvania, *Nitrogen.*
Simon Wolf, Pennsylvania, *Subnitrate of Bismuth.*
Stephen Disbrow Woolley, New Jersey, *Dover's Powder.*
Clifford Monroe Woolston, New Jersey, *Pilocarpus Pennatifolius.*
Isaac Wilson Worthington, Pennsylvania, *Zeæ Stigmata.*

A pleasant reunion took place in the museum hall of the College on the evening of Tuesday, March 14th, in response to an invitation of the fac-

ulty, the graduates, the members of the Board of Trustees, and the assistants of the professors participating. After justice had been done to the collation provided, speeches were made relating to the history of the College, to the deceased members and professors that had been active in it, to the prospects and contemplated improvements for the future, to College life and other matters, both humorous and serious, interspersed with recitations and songs.

The commencement of the sixty-first session of the College took place at the Academy of Music, on the evening of March 15th, the large edifice being well filled with an appreciative audience. The degree of Ph.G. was conferred upon the graduates by the Pressident of the College, Dillwyn Parrish, after which the Procter prize gold medal was awarded by Mr. Thomas Perot, on behalf of the Board of Trustees, to Virgil Coblentz, of Springfield, O., and to Jonas G. Clemmer, of Philadelphia, and honorable mention was made of the following, who had attained the grade *very satisfactory* at the examinations: B. A. Cunningham, C. A. Schoenenberger, S. E. Schweitzer, D. J. Thomas, J. H. Harmanson, G. M. Schambs, J. K. Lilly, W. H. Mehl, F. C. Scheible, W. E. Roeschel, Julius Way, J. H. Knouse, E. B. Merriam, F. W. E. Stedem, O. H. Gentry, W. D. Reynolds, G. W. Hayes and T. W. Reuting.

The prize, a Zentmayer histological microscope, offered by the chair of materia medica, was not awarded for microscopical examination of American drugs, but for the best histological descriptions given in the examination; its recipient was Virgil Coblentz, and honorable mention was made of J. G. Clemmer, B. A. Cunningham, J. H. Harmanson, C. A. Schoenenberger, G. M. Schambs, H. L. Green, D. J. Thomas and G. L. Ott, to the latter for microscopical studies. The prize of a Troemner analytical balance, offered by the chair of chemistry, for the best knowledge of and work on qualitative and quantitative analysis as shown by the thesis, was likewise awarded to V. Coblentz, and honorable mention accorded to J. A. Price, Simon Wolf, G. W. Hayes and J. H. Knouse.

Professor Sadtler delivered the valedictory address, which was listened to with much attention, and at the close of which the graduating class presented a set of the new edition of Enclycopedia Britannica to Professor Maisch, and a handsome clock and pair of vases to the Actuary of the College, Thomas S. Wiegand.

As usual, the exercises alternated with music by the Germania Orchestra, and closed with the distribution of floral tributes and other presents left upon the stage by the friends of the graduates.

The Alumni Association of the Philadelphia College of Pharmacy held its annual meeting on Monday, March 13th, when the following officers were elected: President, Thomas H. Potts; Vice Presidents—L. E. Sayre and C. A. Weidemann; Recording Secretary, Wm. E. Krewson; Corresponding Secretary, Wm. A. Ball; Treasurer, Edward C. Jones; Executive Board—J. E. Cook, J. S. Beetem, Louis Genois, D. W. Ross, H. Trimble and Wallace Procter; Trustee of Sinking Fund, T. S. Wiegand; Orator for 1883, Louis Genois.

On the evening of the same day the reception of the Alumni was held at the College in the Pharmacy lecture room, which was well filled by the Alumni, their ladies and friends. The President, Mr. Henry Trimble, presided. The Alumni gold medal was presented to Virgil Coblentz, and certificates to the following graduates who had passed the best *very satisfactory* examination in the branches named, namely, to B. A. Cunningham, materia medica; to J. G. Clemmer, pharmacy; to W. H. Mehl, chemistry; A. Schoenenberger, general pharmacy; to T. W. Reuting, pharmaceutical manipulations. The Alumni certificate for the best Junior examination was presented to Miss Grace Lee Babb, of Eastport, Me., and honorable mention was accorded to W. F. Jungkunz and C. L. Leonhard, who had passed a very satisfactory Junior examination. The annual address was delivered by Prof. F. B. Power, and the valedictory address on behalf of the graduates by H. Webster.

After the close of these exercises, the members of the Zeta Phi Alpha Society held their first triennial reunion in the new Museum Hall of the College. About one hundred members and ladies sat down to the supper provided for the occasion, and spent a few pleasant hours of social intercourse.

THE NEW YORK COLLEGE OF PHARMACY held the commencement of the 52d Session at Chickering Hall on Wednesday evening, March 22d, when the Degree of Ph.G. was conferred upon the following candidates:

H. C. Baker
J. Beavers
L. I. Bischof
G. Boehme
H. Bohmfalk
F. Bosch, Jr.
C. C. Bradley
J. E. Branigan
W. A Burrows
H. A. Chapin
J. Clarke
G. H. Cooke
G. Dahlbender
R. B. Dakin
E. A. Denicke
J. F. Doring
J. Eckert
B. Ettinger
W. V. Everett
F. W. Fenn
F. L. Fieger
L. Fischer
J. P. Foland
R. Gastmeyer
H. Goemann
J. M. Hedenberg
George O. Heffter
H. E. Hoffmann
P. E. Hommell
H. W. Hoops, Jr.
W. Hunte
J. H. Hutchens
J. E. Jackson
O. Jantze
W. Johnson
L. H. Lesser
J. Loewenstein
Theo. Lutz
J. P. Manck
W. J. McLaughlin
George Minrath
D. R. Morgan
D. C. Moriarta
H. G. Nadler
I. L. Nascher
G. R. Newby
P. O'Connell
P. O'Reilly
W. J. Parshall
J. E. Parsons
C. A. Passmore
E. R. Petty
H. R. Purdy
M. Rafter
H. V. Roese
F. Ruppert
E. M. Sedgwick
G. E. Schneider
J. R. Schoonover
E. F. Sickenberger
R. Sieburg
H. N. Siegenthaler
W. E. Simpson
T. A. Smith
W. Stern
G. C. P. Stolzenburg
C. E. Tallman
C. Teubner
W. H. Tyler
A. F. Underwood
A. C. G. Vosseler
O. Wagner
R. Walker
M. L. Walters
M. C. Warsaw
F. I. Watkins
F. Wenzel, Jr.
G. F. Westbrook
E. Winters
F. Wirth
J. G. Wischerth
J. Woelfel, Jr.
G. B. Wray

The following passed in Botany and Chemistry: DeL. Haigh and H. J. Owens, and L. Stollmann in Pharmacy only.

At the annual meeting of the College, the following officers were elected: President, Ewen McIntyre; Vice Presidents—Gustavus Ramsperger, Henry J. Menninger, George C. Close; Treasurer, Starr H. Ambler; Secretary, M. L. M. Peixotto; Trustees—Joseph B. Mauch, F. F. Knapp, for one year; A. Tscheppe, Gust. Balser, Hermon W. Atwood, Herbert Hazard, for three years; Delegates to American Pharmaceutical Association—Charles Rice, G. J. Seabury, M. L. M. Peixotto, L. M. Royce, T. J. Macmahan.

MARYLAND COLLEGE OF PHARMACY.—The commencement of the thirtieth course was held at the Academy of Music, March 29th, when the degree of Ph.G. was conferred by the President, Dr. Jos. Roberts, upon the following candidates:

Samuel Bachrach, Virginia, *Potassium Iodide.*
John G. Beck, Maryland, *Salicylic Acid.*
Thos. W. Blackstone, Virginia, *Opium.*
J. Fuller Frames, Maryland, *Tabacum.*
William P. Friese, Maryland, *Zincum.*
Chas. S. Haugh, W. Virginia, *Cinchona and Alkaloids.*
August Kach, Maryland, *Eucalyptus Globulus.*
Sylvester R. Kelley, Jr., Maryland, *Carbolic Acid.*
William Kroh, Maryland, *Ethers.*
Gustave Lindeman, Maryland, *Emulsions.*
Robert S. McKinney, Maryland, *Organic Chemistry.*
J. Gordon Mallette, Georgia, *Cascara Sagrada.*
Samuel Schmidt, Maryland, *Heat.*
Anthony H. Schultze, Maryland, *Iron Oxides.*
Howard C. Silver, W. Virginia, *Iodine and its Compounds.*
J. Charles Smith, Pennsylvania, *Hydrargyrum.*
Conrad Wich, Maryland, *Pilocarpus.*

The following prizes of the College were awarded: to Samuel Schmidt, gold medal; to August Kach, Webster's Unabridged Dictionary and Fresenius' Analysis; to Conrad Wich, Stillé & Maisch's Dispensatory and Parrish's Pharmacy. William Krauss received the Junior Class prize of the College, consisting of a copy of Parrish's Pharmacy, and Anthony B. Schultze was awarded the Simon prize, consisting of a gold medal.

The Junior students entitled to honorable mention, are Louis F. Kornman, J. J. Valentine, A. Edwin Schmidt, Geo. A. Thompson and Manes E. Fuld.

The valedictory address was delivered by Rev. Robt. H. Fulton.

ALUMNI ASSOCIATION OF THE LOUISVILLE COLLEGE OF PHARMACY.—At the seventh annual meeting held on Tuesday evening, March 14th, the following officers were elected for the ensuing year: President, Edward Goebel; Vice Presidents—Otto E. Müller, Wm. F. Tafel; Treasurer, O. A. Beckmann; Recording Secretary, A. J. Elwang; Corresponding Sec-

retary, Simon Flexner; Executive Board—Buckle, Schoettlin, Flexner, Rudell and Scheffer, Jr.; Delegates to American Pharmaceutical Association—Messrs. Mueller, Beckman, Scheffer, Tafel and Schweitzer.

The first prize, a gold medal, was awarded to Simon Flexner for obtaining highest average in Senior class, also a U. S. Dispensatory for best average in Materia Medica. Maisch's Organic Materia Medica was awarded to Walter B. King, of Waco, Texas, for best average in Junior class, also Attfield's Chemistry for best average in Chemistry in Junior class.

St. Louis College of Pharmacy.—The commencement of the sixteenth course took place at Liederkranz Hall on the evening of March 16th, in the presence of a large audience, the exercises being opened with an address by the President, F. W. Sennewald, who also conferred the degree of Ph.G. upon the following candidates:

Gust. H. J. Andreas,	Chas. W. Ferguson,	Wm. Kuhlmeg,
Albert P. Bentz,	Jas. G. Flint,	Louis F. Lehnherr,
Chas. W. Bentz,	Edward G. Gerding,	Theo. C. Loehr,
Geo. Billerth,	Arthur T. Grindon,	Paul W. Scheliha,
Adolph Brandenburger,	Gust. J. Hermann,	Wm. R. Schettler,
Thos. A. Buckland, Jr.,	Wm. A. Hitzelberger,	Joseph P. Tierney,
Dennis A. Byrne,	Aurin B. Hunt,	Jas. W. C. Weums,
Otto Claus,	Lewis P. Kilbourne,	Ernest A. Woehrlin,
Fred. B. Drescher,	Erwin J. Koeberlin,	Francis F. Zeller.
Conrad W. Duewel,		

Honorable mention was made of C. W. Ferguson, E. J. Koeberlin, D. A. Byrne, T. C. Loehr and C. W. Bentz; also of ten Junior students who had passed very creditable examinations. The valedictory address in behalf of the faculty was delivered by Prof. O. Oldberg, who spoke on the changes in the forthcoming new pharmacopœia; and the address on behalf of the graduates by J. W. C. Weums. The Alumni medal for the best examination was presented to J. G. Flint. The exercises were enlivened by music, closed with the distribution of floral offerings and followed by a social hop.

Pittsburg College of Pharmacy.—The third commencement took place at Lafayette Hall, on March 23d, when President G. A. Kelly conferred the degree of Ph.G. on the following candidates: Frank W. Walker, New Brighton, Pa.; Thos. B. Rodgers, Waynesburg, Pa.; George B. Stauver, Wheeling, W. Va.; John A. Schmidt, Pittsburg; Wm. B. Means, Allegheny City.

An address was delivered by Dr. W. H. Daly, and the valedictory address by Prof. S. H. Stevens. After the conclusion of the exercises those present enjoyed dancing and social intercourse for several hours.

The Lancaster County, Pa., Pharmaceutical Association was organized March 23, in Association Hall, Lancaster. A constitution and by-laws were adopted and signed by fifteen members. An adjourned meet-

ing for the election of officers will be held in Grand Army Hall, on April 13.

The Iowa Pharmaceutical Association held its third annual meeting at Des Moines on February 14th and 15th, the President, George B. Hogin, in the chair; Emil L. Boerner, Secretary. The President delivered his annual address and reports were read from the Secretary, Treasurer and Executive Committee. Charges had been preferred against the former Secretary, H. W. Dodd, which, after having been investigated by a special committee, resulted in the adoption of a resolution expelling Mr. Dodd from the Association. Reports were also read from the various standing and special committees and considerable discussion ensued on the subjects of trade interests and amendments to the pharmacy law. A memorial to the Legislature was adopted and signed by the members present, recommending to so amend the pharmacy law as to make its language unequivocal, with the view of preventing abuses in the traffic of liquors under the guise of a druggist; amendments were also recommended favoring an annual registration tax of $1.00, requiring the prominent display of the certificate of registration and forfeiting the right of re-registration, except by examination, to those who are registered by reason of being in business at the passage of the pharmacy act and who discontinue the drug business for twelve months.

The officers elected for the ensuing year are A. R. Townsend, of Boone, President; J. W. Ellis, of Patterson, C. R. Wallace, of Independence, and W. C. Bryant, of Cedar Falls, Vice Presidents; Emil L. Boerner, of Iowa City, Secretary; C. H. Ward, of Des Moines, Treasurer, and Norman Lichty, of Des Moines, J. A. Treat, of Stuart, and Gust. Schlegel, of Davenport, Executive Committee.

The various standing committees were appointed and, after passing votes of thanks to the President and other officers, the Association adjourned to meet next year at Davenport.

Indianapolis Pharmaceutical Association.—In response to a call issued, a number of Indianapolis pharmacists assembled, March 8th, at Merchants' Exchange to make arrangements with the view of organizing a pharmaceutical association. Mr. Eli Lilly was chosen temporary chairman and Jos. R. Perry temporary secretary. After the objects of the meeting had been stated and the various committees appointed, steps were at once taken for organization, and a committee on constitution, by-laws and code of ethics was appointed, to report at a meeting to be held March 15th.

At this meeting, Geo. W. Sloan was made chairman and Jos. R. Perry, secretary. The committee made their report, which was accepted and adopted, and the constitution, by-laws and code of ethics was signed by nearly all present.

The Secretary then read communications from nearly 100 pharmacists throughout the State, who signified their intention of attending the meeting, May 9th, when it is hoped a State association may be organized.

Following this came the election of officers, which resulted as follows: President, J. B. Dill; Vice Presidents—J. N. Hurty, H. C. Pomeroy; Recording Secretary, Frank H. Carter; Corresponding Secretary, John A. Lambert; Treasurer, Henry Kielhorn; Executive Committee—George W. Sloan, F. A. Bryan, C. H. Schad.

A motion made by Mr. Sloan to select a subject for general discussion at the next meeting, March 29th, was carried, and "Emulsions" was selected.

EDITORIAL DEPARTMENT.

Local and State Pharmaceutical Associations.—At the last meeting of the Pennsylvania Pharmaceutical Association a report brought forward by the Trade Association of Philadelphia Druggists was the cause of the recommendation to form County Societies. We are pleased to be able to report in this number the organization, under this recommendation of the first County Pharmaceutical Association outside of Philadelphia, that of Lancaster. A number of years ago a similar society was in existence in Allegheny county, from which the Pittsburg College of Pharmacy originated. The trade interests, however, we believe, are best taken care of by organizations having that object especially in view, and we hope that the example of Lancaster county may soon be followed by other localities.

The Indianapolis Pharmaceutical Association, the organization of which is reported in the present number, is to be regarded as the forerunner of an association embracing the pharmacists and druggists of the State of Indiana, and which it is contemplated to organize in Indianapolis May 9th. There being much excellent material in that State, a successfal organization and efficient association may be expected, and since quite recently a State association was formed in Virginia there will be few States left in which no State Pharmaceutical Association exists, or where it has been allowed to become dormant.

Nostrums and Household Remedies.—We have received the following communication:

As I see from the "American Journal of Pharmacy," 1882, p. 93, you seem to think that people could in a great measure be influenced in their indiscriminate employment of secret medicines (whether patent or proprietary) by being informed of their composition, etc. Will you allow me to dissent from you?

People here in the United States (and, it seems, largely in Europe, too) are accustomed to doctor themslves, and prefer, naturally, already put-up medicines, stated by somebody—immaterial who—to be good for their supposed ailments. They feel bound to get them, they are not used to be without them—they *must* have them! Now, I contend that mere telling and proving to them that all patent medicines are frauds upon their health and pocket, and likely to produce great mischief, and all that—will be looked upon with suspicion, as dictated by self-interest, one way or the other. You will need something stronger, more tangible.

People are bent on using put-up medicines. Well, humor them! Give them what they want! Let them, instead of concoctions, the composition of which everybody ignores—*even the makers*—let them get medicines put up by conscientious men (for instance, the pharmacists themselves), and having the formula stated in full on the label. In this way you fight, and will ultimately *defeat*, the patent medicine swindle, with its own weapons. When you have succeeded in breaking the back of the patent pest in this way (by making it unprofitable), then you and the physicians can turn your attention to your late ally, and modify the formulas and directions so as to keep both within safe bounds.

Preaching is very well, but we have to deal with human nature as it *is*, not as it *ought to be*. People want to *take something!*

Respectfully yours, HANS M. WILDER.

Detroit, February 25, 1882.

The editor's views do not differ to a very great extent from those expressed by our correspondent, as will be readily seen by the numerous editorial remarks printed in former volumes of the JOURNAL. Information on health matters is, in our opinion, not disregarded by *intelligent* persons; to ignorant or prejudiced people argumentation is of little or no avail. Yet, because there are many of the latter kind, should the former class be left to drift along among the many secret medicines that flood the market everywhere? This question is intimately connected with that relating to the composition of the nostrums and the danger arising from the indiscriminate use of poisonous compounds. Nearly all the States have enacted laws regulating the sale of poisons; yet, under the garb of patent medicine, poisons in dangerous quantities may be and are sold to the most ignorant, and not unfrequently shorten the life of the over-confiding. Such cases have been often cited in medical and pharmaceutical journals, and at the preseut time a case is being investigated before the Coroner of Philadelphia, where an infant, attacked with croup, died of the effects of a dose of a nostrum, a so-called cough syrup, which is said to contain a powerful narcotic. If the composition of such concoctions was known, if manufacturers were compelled to divulge the composition of the nostrums by printing the correct ingredients upon the labels, the harm that would be done by them would be greatly lessened, and under the poison laws of the different States many of the so-called popular medicines could then not be indiscriminately sold, and would doubtless be replaced by preparations made according to authorized formulas; such a course we have always held "to be the only rational one calculated to be an entering wedge for the suppression of nostrum quackery" ("Am. Jour. Phar.," 1874, p. 90).

Medicine and Pharmacy have as one of their main objects the preservation of health and life, and it is strange, indeed, that a united move of the two professions has not yet been made in the correction of an acknowledged evil. Household medicines, to be of practical usefulness, should be adapted to the wants of the different localities, and both physicians and pharmacists would, in our opinion, only consult and advance their own interests, if they were to promote the interests of the public by pointing out the manner of preserving the health, and offering the means of alleviating slight indispositions, for which the large majority of the people

rarely consult the physician. It is possible that one cause of this non-action may be found in the non-existence of local pharmaceutical societies, a drawback which bids fair to be remedied in the near future; but much good might have been accomplished in this direction by the numerous county medical societies, if they had agreed upon simple remedies for ordinary complaints, to be furnished by the pharmacists of their localities in place of the secret medicines.

Such, or similar plans, carried out in a liberal spirit, we feel convinced "would accomplish more towards reducing the number of proprietary medicines and dangerous compounds indiscriminately sold, than ever so many pamphlets addressed to the public, or resolutions passed by medical or pharmaceutical societies" ("Am. Jour. Pharm.," 1874, p. 542).

We do not believe that people want "put-up" medicines; those living in thinly populated districts will necessarily want to keep a certain quantity of medicine on hand for such ailments as their experience has taught them, are likely to occur; this want should be supplied. Where drug stores are readily accessible, it will as a rule be preferred to purchase only as occasion requires; that want should also be supplied. We know of no better way to accomplish this than the one pointed out above; but we cannot see any inconsistency in a course that contemplates at the same time giving information to the public, tending to impart more correct views on the preservation of health and the cure of disease, than can be obtained from the circulars and pamphlets of manufacturers of secret medicines.

Corrassa Compound.—We give place to the following communication, which gives the plain facts in relation to this largely advertised nostrum. None of our readers has probably been "taken in" by the "generous" offer of the advertiser, and it is needless to state that the plants—or are some of them animals?—can nowhere be had in the wide, wide world, except from the "Rev." proprietor of the secret:

Editor American Journal of Pharmacy:

Having long seen the advertisement of "Rev. Jos. T. Inman, Station D, N. Y. City," offering, gratis, "a recipe for the speedy cure of all diseases brought on by errors of youth," etc., and believing him to be one of those who prey upon this unfortunate class, I sent for the "Recipe." It is as follows:

Extract of corrassa apimis, . . .	eight drachms.
Extract of selarmo umbelifera, . .	four drachms.
Powdered alkermes latifolia, . . .	three drachms.
Extract of carsadoc herbalis, . .	six drachms.

This mysterious formula is accompanied by minute directions and a lengthy and pathetic history of its discovery in "South America."

It is needless to add that the "Rev." very kindly offers to send a package on receipt of $3.50—"actual cost."

The above is but one address under which this same man sails; "Geo. B. Tuttle, 31 Maiden Lane, N. Y.," will bring the same circular and recipe—only with different name.

Believing it to be the duty of all honest men (pharmacists especially, as they have greater opportunities to do so) to expose such frauds and quack nostrums generally, I send this to the Journal. A. M. Martin.

Red Oak, Iowa, March 23, 1882.

PHOSPHATE OF IRON.—A correspondent, whom we should have preferred to answer by letter if he had sent us his address, inquires if free hydrogen is liberated in making phosphate of iron according to the process of the British Pharmacopœia. On adding together ferrous sulphate and phosphate of sodium, a white precipitate is obtained which, if the air be totally excluded, after washing and drying, forms a white powder, having the composition $Fe_3(PO_4)_2.8H_2O$, which is that of the mineral vivianite. In contact with air, however, oxidation takes place and the resulting compound has a grayish-, greenish- or steel-blue color, and contains both ferrous and ferric phosphates in variable proportion. The analytical results obtained by different investigators varied as follows: FeO 10·23—30·47, Fe_2O_3 36·8—12·93, P_2O_5 25·8—31·20, H_2O 22—28·1 per cent. A number of these blue phosphates have been analyzed by Wittstein, whose paper will be found in "Repert. für die Phar.," 1845, vol. 89, p. 145. Since this oxidation is effected by the oxygen of the air, it is evident that hydrogen is not evolved.

THE SCIENTIFIC AMERICAN, whose office was recently destroyed by fire in New York, shortly afterwards located at 261 Broadway, corner of Warren street. We are glad to learn that no loss of types, plates, etc., was occasioned by the fire, since the printing was done in another building.

OBITUARY.

CHARLES HOAGLAND DALRYMPLE, a prominent apothecary of Morristown, N. J., died there March 4th, after a short illness, of pneumonia, having nearly completed his fifty-second year. He was born near Dover, Morris county, N. J., and in his sixteenth year engaged as an apprentice in the drug business with Jacob M. King at Morristown. Five years later he accepted a position in Canton, Madison county, Miss., but in 1853 he returned to Morristown, taking charge of the drug store of J. F. Vorhees, in which he soon became a partner, and in 1858 the sole proprietor.

He joined the American Pharmaceutical Association in 1860, and although he rarely took any prominent part in its deliberations, his kind, genial and warm-hearted disposition, as well as his mature judgment, love of work and sterling qualities as a man secured him the friendship and esteem of all members who became acquainted with him; important committee work entrusted to him on several occasions was always well performed.

He was also one of the organizers and the first President of the New Jersey Pharmaceutical Association, and took great interest in its welfare and in the success of the pharmacy law of his native State. In the community where he resided he was repeatedly elected to various positions of honor and trust, in all of which he acquitted himself with his accustomed care, zeal and reliability. The deceased leaves a widow, three sons and two daughters. During the funeral services the stores of Morristown were closed out of respect to his memory.

THE AMERICAN JOURNAL OF PHARMACY.

MAY, 1882.

STRENGTH OF ALCOHOLIC MENSTRUA, REFERRED TO COMMERCIAL ALCOHOL AS A STANDARD.

By A. B. Lyons, A.M., M.D., Detroit, Mich.

Most of the existing tables which give the alcoholic strength of distilled spirits adopt absolute alcohol as the basis for all computations. Many calculations in practice, however, would be greatly simplified by adopting the stronger alcohol of the pharmacopœia, which coincides nearly with commercial alcohol, as a standard. Among the problems of most frequent occurrence in practice are the estimation of the commercial value of spirit of a given density, or the preparation from commercial alcohol of a menstruum which shall contain a given proportion of alcohol, by volume or by weight.

While there are many pharmacists who will adopt at once the practice of weighing alcohol, when the pharmacopœia so directs, there are many others who will find it still convenient to follow their accustomed practice of measuring it, and some even, I have no doubt, will go so far as to translate for practical use the weights of the new formulas into volumes. Partly to accommodate such, but chiefly because alcohol is still bought and sold by the gallon, and not by the pound, I have adopted volume rather than weight as the central idea of the accompanying tables. Hence, for commercial alcohol I have used the expression 94 per cent. alcohol, even where weight rather than volume is immediately under consideration. The expression commercial alcohol is open to objection, inasmuch as the commercial article is not of uniform strength.

The use of the tables is obvious without elaborate explanation.

A spirit of any desired strength may be made, of course, by putting into a graduated receiver the required amount of alcohol (of commerce) and adding water to make up the desired volume. Where accuracy is not aimed at this plan commends itself by its simplicity, but unless time is given for the mixture to cool, the resulting spirit will be too

strong. It is true that in practice this error offsets that arising from deficiency in the strength of the commercial spirit, but where exactness is desired neither error must be allowed to take its chance of correction in this way. Hence, in the table there will be found the proportion by volume—or by weight, as the case may be—of water that should be added to a given volume of alcohol of 94 per cent. (at 60°F.) to produce any required mixture.

Even where the fluids are weighed, it is often desired to make up a certain volume of menstruum, and it is to facilitate the calculation in such cases that the fourth column in the table is added. It is required, *e. g.*, to make one liter of a mixture which shall contain 25 per cent. by weight of absolute alcohol. By the table it appears that such a mixture will consist of about 700 cc. of distilled water and 323 cc. of 94 per cent. alcohol. The equivalent of the first may be taken as 700 grams; that of the latter is given in the table as 265 grams. [The figures given are obtained from the table, of course, by interpolation, but if such a trifling mathematical operation seem formidable to any, the nearest figure in the table may be used as giving a close approximation to the desired amounts.]

Correction for Temperature.—If mixtures of alcohol and water are to be made by volume at a temperature above or below 60°F., a correction must be made, the volume of the alcohol being increased by $\frac{1}{10}$ of 1 per cent. for each 27°F. in excess of 60°, or diminished in a similar ratio if below 60°.

Specific Gravity at 60°F.	100 Volumes contain		Weight of 94 per ct. Alcohol in Col. II.	Per cent. by weight of 94 per cent. Alcohol.	100 Vols. contain Absolute Alcohol (Vols.)	Per-cent. by weight of Absolute Alcohol.
	Alcohol of 94 p. c. (Vol.)	Water. (Vol.)				
·9986	1·	99·04	0·82	·82	·94	·75
·9972	2·	98·08	1·64	1·65	1·88	1·50
·9958	3·	97.12	2·46	2·47	2·82	2·25
·9945	4·	96·17	3·28	3·30	3·76	3·00
·9933	5·	95·23	4·10	4·13	4·70	3·76
·9920	6·	94·28	4·92	4·96	5·64	4·53
·9908	7·	93·34	5·74	5.79	6·58	5·27
·9897	8·	92·41	6·56	6·63	7·52	6·02

Specific Gravity at 60°F.	100 Volumes contain Alcohol of 94 p. c. (Vol.)	Water. (Vol.)	Weight of 94 per ct. Alcohol in Col. II.	Per cent. by weight of 94 per cent. Alcohol.	100 Vols. contain Absolute Alcohol (Vols.)	Per cent. by weight of Absolute Alcohol.
·9884	9·	91·46	7·38	7·48	8·46	6·79
·9874	10·	90·54	8·20	8·31	9·40	7·56
·9863	11·	89·61	9·03	9·16	10·34	8·32
·9852	12·	88·67	9·85	10·00	11·28	9·09
·9842	13·	87·75	10·67	10·84	12·22	9·86
·9832	14·	86·82	11·49	11·69	13·16	10·63
·9821	15·	85·90	12·31	12·53	14·10	11·40
·9811	16·	84·98	13·13	13·38	15·04	12·17
·9802	17.	84·05	13·95	14·23	15·98	12·94
·9793	18·	83·16	14·77	15·08	16·92	13·72
·9784	19·	82·25	15·59	15·93	17·86	14.49
·9775	20.	81·34	16·41	16·79	18·80	15·27
·9766	21·	80·43	17·23	17·64	19·74	16·05
·9756	22.	79·51	18·05	18·50	20·68	16·83
·9746	23·	78·59	18·87	19·36	21·62	17·60
·9736	24·	77·67	19·69	20·22	22·56	18·39
·9726	25·	76·74	20·52	21·09	23·50	19·18
·9717	26·	75·83	21·34	21·96	24·44	19·97
·9707	27·	74·91	22·16	22·83	25·38	20·75
·9697	28·	73·99	22·98	23·70	26·32	21·55
·9687	29·	73.07	23·80	24·57	27·26	22·34
·9677	30·	72·15	24·62	25·44	28·20	23·13
·9666	31·	71·22	25·44	26·32	29·14	23·93
·9656	32·	70·30	26·26	27·20	30·08	24·73
·9645	33·	69·37	27·08	28·08	31·02	25·53
·9634	34·	68·44	27·90	28·96	31·96	26·33
·9623	35·	67·51	28·72	29·85	32·90	27·14

Specific Gravity at 60°F.	100 Volumes contain Alcohol of 94 p. c. (Vol.)	Water. (Vol.)	Weight of 94 per ct. Alcohol in Col. II.	Per cent. by weight of 94 per cent. Alcohol.	100 Vols. contain Absolute Alcohol (Vols.)	Per cent. by weight of Absolute Alcohol.
·9610	36·	66·56	29·54	30·74	33·84	27·95
·9597	37·	65·61	30·36	31·63	34·78	28·76
·9585	38·	64·67	31·18	32·53	35·72	29·58
·9572	39·	63·72	32·00	33·43	36·66	30·40
·9559	40·	62·77	32·82	34·33	37·60	31·22
·9545	41·	61·81	33·64	35·24	38·54	32·05
·9531	42·	60·84	34·47	36·16	39·48	32·88
·9516	43·	59·87	35·29	37·08	40·42	33·71
·9501	44·	58·90	36·11	38·01	41·36	34·54
·9486	45·	57·93	36·93	38·93	42·30	35·39
·9470	46·	56·95	37·75	39·86	43·24	36·24
·9454	47·	55·97	38·57	40·80	44·18	37·11
·9438	48·	54·99	39·39	41·74	45·12	37·96
·9421	49·	54·00	40·21	42·68	46·06	38·81
·9404	50·	53·01	41·03	43·63	47·00	39·67
·9387	51·	52·02	41·85	44·58	47·94	40·54
·9369	52·	51·02	42·67	45·54	48·88	41·41
·9351	53·	50·02	43·49	46·51	49·82	42·29
·9333	54·	49·02	44·31	47·47	50·76	43·17
·9315	55·	48·02	45·13	48·45	51·70	44·06
·9296	56·	47·01	46·05	49·44	52·64	44·95
·9277	57·	46·00	46·77	50·42	53·58	45·85
·9258	58·	44·99	47·59	51·42	54·52	46·75
·9239	59·	43·97	48·52	52·42	55·46	47·66
·9219	60·	42·95	49·24	53·42	56·40	48·57
·9199	61·	41·93	50·06	54·42	57·34	49·49
·9179	62·	40·91	50·88	55·43	58·28	50·42

Specific Gravity at 60°F.	100 Volumes contain		Weight of 94 per ct. Alcohol in Col. II.	Per cent. by weight of 94 per cent. Alcohol.	100 Vols. contain Absolute Alcohol (Vols.)	Per cent. by weight of Absolute Alcohol.
	Alcohol of 94 p. c. (Vol.)	Water. (Vol.)				
·9158	63·	39·88	51·70	56·45	59·22	51·36
·9138	64·	38·86	52.42	57·47	60·16	52·31
·9117	65·	37·83	53·34	58·51	61·10	53·19
·9095	66·	36·79	54·16	59·56	62·04	54·15
·9073	67·	35·75	54·98	60·60	62·98	55·10
·9052	68·	34·72	55·70	61·65	63·92	56·05
·9030	69·	33·68	56·52	62·73	64·86	57·02
·9009	70·	32·65	57·34	63·78	65·80	57.98
·8986	71·	31·60	58·26	64·83	66·74	58·96
·8963	72·	30·55	59·08	65·92	67·68	59·94
·8941	73·	29·51	59·90	67·00	68·62	60·92
·8818	74·	28·46	60·72	68·10	69·56	61·92
·8895	75·	27·40	61·55	69·20	70·50	62·91
·8871	76·	26·34	62·37	70·31	71·44	63·93
·8847	77·	25·28	63·19	71·43	72·38	64·94
·8822	78·	24·21	64·01	72·56	73·32	65·97
·8799	79·	23·18	64·83	73·68	74·26	66·99
·8774	80·	22·09	65·65	74·82	75·20	68·04
·8749	81·	21·02	66·47	75·97	76·14	69·08
·8724	82·	19·95	67·29	77·13	77·08	70·13
·8699	83·	18·88	68·11	78·30	78·02	71·20
·8673	84·	17·79	68·93	79·48	78·96	72·27
·8648	85·	16·73	69·75	80·66	79·90	73·35
·8622	86·	15·65	70·57	81·85	80·84	74·43
·8597	87·	14·58	71·39	83·05	81·78	75·51
·8570	88·	13·49	72·21	84·27	82·72	76·63
·8542	89·	12·39	73·03	85·51	83·66	77·74

Specific Gravity at 60°F.	100 Volumes contain: Alcohol of 94 p. c. (Vol.)	100 Volumes contain: Water. (Vol.)	Weight of 94 per ct. Alcohol of Col. II.	Per cent. by weight of 94 per cent. Alcohol.	100 Vols. contain Absolute Alcohol (Vols.)	Per cent. by weight of Absolute Alcohol.
·8513	90·	11·28	73·85	86·75	84·60	78·88
·8486	91·	10·19	74·67	87·99	85·54	80·02
·8455	92·	9·05	75·50	89·25	86·48	81·19
·8429	93·	7·97	76·32	90·54	87·42	82·33
·8400	94·	6·86	77·14	91·83	88·36	83·50
·8368	95·	5·72	77·96	93·15	89·30	84·71
·8338	96·	4·60	78·78	94·48	90·24	85·91
·8306	97·	3·46	79·60	95·83	91·18	87·14
·8274	98·	2·32	80·42	97·20	92·12	88·38
·8240	99·	1·16	81·24	98·59	93·06	89·65
·8206	100·	0·00	82·06	100·00	94·00	90·93

CHEMICAL NOTES.

By Prof. Samuel P. Sadtler, Ph.D.

Inorganic Chemistry.—*Commercial Manufacture of Oxygen.*—It is said that MM. Brin have greatly improved Boussingault's process for the manufacture of oxygen by alternately peroxidizing and re-oxidizing barium oxide. The material employed, after being re-used 400 times, was found not to be deteriorated. MM. Brin calculate on being able to supply oxygen on the large scale at 12 to 15 centimes per cubic meter.—*Les Mondes* and *Eng. Chem. News*, 45, p. 125.

Production of Active Oxygen out of Hydrogen Peroxide.—Moritz Traube has summarized the results of a lengthy investigation upon the development of active oxygen as follows:

1. Palladium charged with hydrogen, when shaken up with water and oxygen (air) yields immediately and abundantly hydrogen peroxide, a matter which has been hitherto overlooked.

2. The oxidizing action of hydrogenized palladium in the presence of oxygen and water arises not directly from the palladium itself, but almost exclusively from the hydrogen peroxide developed.

3. In one case only is the oxidizing action of hydrogenized palladium in the presence of water and oxygen different from that of hydrogen peroxide. While hydrogen peroxide does not turn a mixture of potassium iodide and starch blue, hydrogenized palladium and oxygen bring about a rapid change to blue color. This is because the palladium in this case brings about a transfer of the oxygen from the hydrogen peroxide to the potassium iodide.

4. Contrary to the views of Hoppe-Seyler, I have found that nascent hyrogen is not able to develop active oxygen by splitting the oxygen molecule.

5. The common development of hydrogen peroxide in oxidation processes is no proof of the simultaneous presence of the active oxygen atom, as the peroxide is never formed by the oxidation of water, by means of an active oxygen atom, as has been hitherto assumed. In every oxidation process it results as a consequence of a reduction.

If, for instance, zinc be shaken up with water and oxygen, we obtain, as is known, along with zinc hydrate, hydrogen peroxide. My experiments show, however, that in this case there is no active oxygen formed, and that the molecule of oxygen is not split at all, but rather the molecule of water, the oxygen of which unites with the zinc to form zinc hydrate, while the hydrogen of the water unites with an oxygen molecule to form hydrogen peroxide, as follows:

$$Zn + 2H_2O + O_2 = Zn(OH)_2 + \begin{array}{l} O - H \\ | \\ O - H \end{array}$$

Hydrogen peroxide is, according to this view, a compound of an oxygen molecule with two atoms of hydrogen. It may be termed, if we take the analogy of other compounds formed by the taking up of hydrogen, reduced oxygen, and has the same relation to ordinary gaseous oxygen that indigo-white has to indigo-blue.—*Ber. Chem. Ges.*, xv, p. 22.

ORGANIC CHEMISTRY.—*On the Deodorizing of Bad-Smelling Alcohols by Electrolysis.*—Daudin has observed that the unsaturated aldehydes, which give sharp and unpleasant taste to alcohols, particularly butyl- and amyl-aldehyde, are changed into saturated compounds (alcohols) by electrolytic hydrogen developed in the liquid. The amount of alcohol of good taste, too, that can be gotten from a sample is increased from 25 to 30 per cent. For this hydrogenation they use a copper-zinc couple as prepared by Gladstone and Tribe. For

this purpose a zinc plate is hung in a copper solution, where it soon becomes covered with metallic copper, and acquires the property of dissolving with formation of zinc hydrate and liberation of hydrogen. If such an element is brought in contact with dilute alcoholic solutions, of say 40 to 60 per cent., there is immediate absorption of the liberated hydrogen, and the characteristic unpleasant odor of the crude alcohol solution disappears quite rapidly. If now the solution be distilled there is obtained a yield of alcohol 25 to 30 per cent. greater than by the previous methods, and much better tasting. For the technical details of this important method reference must be had to the original communication.—*Bull. de la Soc. Chim.*, 36, p. 273.

Preparation of Lactic Acid.—H. Kiliani has made the important announcement that lactic acid may be readily prepared by the action of potassium or sodium hydrate upon both grape sugar and invert sugar, or cane sugar, after treatment with dilute acids.

In his first paper he gives the following directions: Dissolve one part of grape sugar in one part of water, and then one part of potassium hydrate in one-half part water. The cooled solutions are mixed in such proportion that for every 10 grams of sugar 10 cb. cm. of potash solution is used. In working with larger amounts the alkali must be added slowly and with constant cooling. The mixture is then warmed for several hours in a stoppered flask to about 35°C., and then allow the temperature to rise gradually to 60°C., and digest until the solution no longer reduces Fehling's solution. This will ordinarily take from 6 to 7 hours, heating. In the meantime determine by simple titration how much of a very concentrated sulphuric acid (3 parts pure acid and 1 part water) is needed to neutralize a given amount of the alkali used in the above experiment. After the cooling down of the mixture in the flask a sufficient amount of sulphuric acid is then added to neutralize the alkali that had been used. While the sulphuric acid is being added potassium sulphate separates out, and the liquid, at first reddish-brown, becomes clearer in color as it becomes acid. It is then concentrated somewhat, and 93 per cent. alcohol is added, with stirring, until a test filtered off remains clear with barium chloride. The filtered alcoholic solution is warmed over the water-bath with carbonate of zinc that has been rubbed up with water to a thick paste, and then filtered boiling hot. If too much alcohol had not been added previously, on cooling the filtrate solidifies to a magma of zinc lactate that is made pure by a single recrystallization. The

weight of the first crystallization amounted in one experiment to 44 per cent. of the pure grape sugar used, which would correspond to 27 per cent. of pure lactic acid.

In a second paper, Kiliani gives fuller results and still more satisfactory directions for the preparation of lactic acid. He here states that the best material for the preparation of lactic acid is invert sugar, as it gives a better yield than ordinary glucose; and that caustic soda is to be preferred strongly to caustic potash. Besides its greater cheapness he finds that the sodium sulphate formed on neutralizing takes up the greater part of the water present, combining with it as water of crystallization. The presence of sulphate in the alcoholic solution can, with proper manipulation, and without the use of too much alcohol, be reduced to a minimum. It is not advantageous to neutralize the entire alcoholic solution with zinc carbonate, as the zinc salt of another acid that is produced at the same time as the lactic acid does not crystallize and interfere with the crystallization of the zinc lactate. The procedure now recommended by Kiliani is as follows: 500 grams of cane sugar are placed, with 250 grams of water and 10 cb. cm. of the sulphuric acid to be used later, in a stoppered flask of 2 liters capacity, and heated for 3 hours to about 50°C. The solution of invert sugar so obtained is colorless, or at most faintly yellow. After cooling, there is added to it, in portions of 50 cb. cm. at a time, 400 cb. cm. of a caustic soda solution made by dissolving 1 part of caustic soda in 1 part of water. The strong alkali settles at first as a slimy mass on the bottom, and a new portion is only to be added when the mixture has become perfectly homogeneous by shaking around. The flask should also be cooled with water while the alkali is being added. The mixture, nevertheless, takes color and becomes greatly heated. Finally, the mixture is heated to 60° to 70°C., until a test heated over a boiling water-bath does not separate cuprous oxide from Fehling's solution, but gives it only a slight greenish tinge. Into the cooled mixture the calculated amount of sulphuric acid (made by mixing 3 parts of sulphuric acid with 4 of water) is then run. As soon as the acid liquid has cooled to the temperature of the room drop in a crystal of Glauber's salt, and dip the flask in cold water until a thin crystalline crust forms on the sides, which is then removed by rapid shaking about of the flask. Cooling and shaking are continued until a crust no longer forms, when the mixture is allowed to stand quiet for 12 to 24 hours. At the end of this time

the contents of the flask appear to consist of a crystalline cake, soaked with a reddish liquid. There is then added 93 per cent. alcohol, and the whole is shaken up until on further addition no precipitate separates out. The separated Glauber's salt is separated from the alcoholic solution by a vacuum filter, and can be washed with relatively very little alcohol. The half of the alcoholic solution is neutralized over the water-bath with carbonate of zinc, filtered boiling hot, and united with the other half. The crystallization begins immediately upon cooling, and is complete after 36 hours' standing. The lactate of zinc so obtained can be pressed free from mother-liquor and recrystallized once, when it is perfectly pure. The weight of this first crystallization amounts to 30 to 40 per cent. of the sugar used. The concentrated mother-liquor yields yet another portion of crystals, which are nearly pure, although slightly yellowish in color.—*Ber. Chem. Ges.*, xv, pp. 136 and 699.

Test for Natural Vegetable Gums.—C. Reichl and F. Breinl give the following test for arabin and bassorin as distinguished from dextrin or artificial gum. The former two, when heated with hydrochloric acid and orcin, give a blue flocculent mass, which with alcoholic potash yields a violet solution, fluorescing green. This reaction is shown by wood gum so easily that even fragments of wood, which contain traces only of gum, when boiled with orcin and hydrochloric acid, show the reaction quite distinctly.—*Chem. Industrie,* Feb., 1882, p. 51.

Change of Xanthine into Theobromine and Caffeine.—Xanthine has the composition $C_5H_4N_4O_2$, and differs from theobromine, $C_7H_8N_4O_2$, by having 2 carbon and 4 hydrogen atoms less. Strecker already suggested that the second base might be a dimethyl derivative of the first. This view had not, however, been hitherto substantiated by experiment. Emil Fischer has now established this fact by converting xanthine into theobromine, and this then into caffeine. He accomplished this by dissolving xanthine in caustic soda solution, and then precipitating by acetate of lead, whereby he got a white crystalline xanthine lead. This salt, dried at 130°C., was heated with 1¼ times its weight of methyl iodide in closed tubes for 12 hours to 100°C. The contents of the tube, which are nearly dry, are boiled with water, freed from remaining lead by hydrogen sulphide, and after saturation with ammonia evaporated to crystallization. There is obtained in this way a slight yellowish crystalline powder, which on analysis proved

to be theobromine. To settle all doubts, it was then converted, after the method of Strecker, into caffeine. So that theobromine and caffeine are to be considered as respectively dimethyl- and trimethylxanthine. The above described change of xanthine into theobromine and caffeine also points to the possibility of obtaining this base, shown to be the fundamental part of two most important articles of diet, from quite a different crude material, viz., guano.—*Ber. Chem. Ges.*, xv, p. 453.

ANALYTICAL RESEARCHES AND INVESTIGATIONS.

COLLATED BY PROF. FREDERICK B. POWER, PH.D.

New Chemical Analysis of Copaiba Balsam.—With respect to the constituents of Maracaibo copaiba balsam the statements existing in chemical literature are considerably at variance, partly in regard to the properties of the therein contained terpene, and partly in view of the crystallizable resinous acids and amorphous resins which may be obtained therefrom. An investigation of Brix, performed in the University laboratory of Barth, at Vienna, which held for its object the elucidation of these differences, confirms in most respects the statements of Strauss (1868).

The Maracaibo balsam contains accordingly a hydrocarbon of the composition $C_{20}H_{32}$, which furnishes no crystallizable compound with hydrochloric acid, and by oxidation with the chloric acid mixture yields acetic and terephtalic acid. By the treatment of the crude terpene with sodium, there results, after the distillation of the colorless oil, upon further distillation a beautiful dark-blue oil, which, in thicker layers, is scarcely transparent, but in thinner layers shows a beautiful violet color. This body is a hydrate of the oil, and corresponds to the formula $3(C_{20}H_{32})+H_2O$. Phosphoric anhydride converts it again into the original terpene. Besides the latter there exists in the Maracaibo balsam a brown hard resin, soluble in alcohol and ether, a yellowish hard resin, sparingly soluble in alcohol, more readily in ether, and melting at 85°C., an amorphous, tough, soft resin, and a crystallizable acid, although in so small an amount that its probable identity with the metacopaivic acid of Strauss could not be definitely established. The extremely small amount of the latter found by Brix in the balsam examined by him, as also the previous statements of Bergmann, Buchheim and Bernatzik, who could obtain no crystalliz-

able acids at all, renders the existence of the latter as belonging to the integral constituents of the Maracaibo balsam somewhat problematical. The product which is furnished by the German chemical manufactories as metacopaivic acid and copaivic acid, is not obtained from copaiba balsam, but from gurgun balsam, and is not identical with Werner's gurgunic acid which, according to Strauss, is the same as metacopaivic acid. Both of the products which occur in trade melt at 126 to 129°C., dissolve in ether and alcohol, even that of 80 per cent., and are precipitated from the alcoholic solution by water in the form of beautiful, long needles, with a silky lustre. Although the obtained formula agrees perfectly with that of copaivic acid, $C_{20}H_{30}O_2$, as determined by the analyses of Rose and Hess, yet its want of solubility in ammonia, as also of all acid properties, excludes its identity with the copaivic acid of older authors. The successful obtainment of an an acetyl product points to the rational formula $C_{20}H_{28},OH_2$.—*Pharm. Zeitung,* No. 16. p. 116, 1882, from *Sitzungsberichte d. Acad. d. Wiss. zu Wien,* No. 6, p. 459, 1881.

Permanent Solution of Litmus.—Various formulas have from time to time been proposed in the journals for obtaining a permanent litmus solution, which appear, however, more or less circumstantial. The author gives a method for obtaining a solution which may be preserved for months in a vessel closed with paper, or even with a cork. The litmus solution is first prepared, according to the suggestion of Mohr, "Lehrbuch der chem.-analyt. Titrirmethode" p. 73, and subsequently evaporated at a temperature of 90°C. to dryness; if the obtained residue is then dissolved in a little glycerin, a solution is obtained which remains permanent for months, and its sensibility is in no wise influenced. By its application it is only necessary to dip a glass rod into the solution, which amount suffices for tinting any required amount of liquid.—H. K. *Ibid.,* p. 117.

Detection of Mercury in Liquids.—Prof. Merget, in Bordeaux, recommends the following very simple procedure for the detection of mercury in liquids. A bright rod of copper, or a copper plate, is dipped into the liquid to be examined, and allowed to remain therein the longer, the smaller the amount of mercury. A strip of paper is previously prepared, by rubbing it with cotton, which has been impregnated with an ammoniacal solution of nitrate of silver, and subsequently allowed to dry. The copper plate is then removed from the liquid, dried by pressing it between bibulous paper, and enclosed in doubly

folded silk paper, which is then covered by the reagent paper, and kept in position by allowing a book or other object to rest upon it. The reaction is rendered evident upon the silk paper, without the direct contact of the metal, and after a few minutes a deposit of silver is formed upon the paper, and which corresponds to the length of the copper plate which has been immersed in the liquid. By means of this extremely sensitive reaction mercury may be detected in the blood of small animals which have been slowly destroyed by exposure to mercurial vapors, as also with certainty in the urine of syphilitic persons, who have been subjected to mercurial treatment.—*Ibid.*, No. 18, p. 132, 1882, from *Journ. de med. de Bordeaux*, p. 339, 1881.

Distinction between Cadaver and Plant Alkaloids. By H. Beckurts. —Since the knowledge of the fact that in dead bodies, through the influence of putrefaction, alkaloidal bodies—scepticines, or the ptomaines of Selmi, may be formed, which, in their chemical reactions, show a behavior quite analogous to that of the plant bases, the attempt has been repeatedly made to discover characteristic points of distinction between them.

General reactions, by means of which it may be readily and certainly decided whether a plant alkaloid or one of the so-called ptomaines is in question, have remained as yet unknown. The discovery of such must also remain for the present at least problematical, as long as the knowledge of the chemical nature of the ptomaines remains so deficient, and when under the latter designation an entire group of compounds is comprehended, the members of which, apparently, formed under the same conditions, exert a varying physiological action, and probably stand also in very loose chemical connection. Our interest, therefore, must be attracted the more to a recently puplished essay of Brouardel and Boutmy ("Comptes Rendus," 1881, p., 92, 1056), wherein they maintain to have found in potassium ferridcyanide a reagent which will distinguish these two classes of bodies. Plant alkaloids, according to the statements of these chemists, do not change this salt, whereas the ptomaines reduce the same at once to potassium ferrocyanide, which may be recognized by a precipitate of Prussian-blue on the addition of a ferric salt. An exception to the rule is morphine and veratrine, of which the former has a strong reducing action, the latter to a lesser extent.

The importance of this statement for forensic chemistry induced the author to repeat the related experiments, but only with regard to the

behavior of the plant alkaloids towards potassium ferricyanide, as the reducing action of the ptomaines has been emphasized by all investigators as a characteristic property, and therefore does not require a repeated confirmation by experiments.

The experiments were so conducted that for each a centigram of the alkaloid was dissolved in five cubic centimenters of water with the acid of diute sulphuric acid, then two drops of a ten per cent. solution of potassium ferricyanide added, and subsequently one drop of a very dilute neutral ferric chloride solution.

Morphine and colchicine reduced the potassium ferricyanide very strongly; the mixture, upon the addition of ferric chloride, became immediately dark-blue. A less strong, but still plainly perceptible reduction, recognizable by the formation of a greenish-blue liquid after the addition of ferric chloride, and from which immediately, or after a short time flocks of Prussian-blue were precipitated, was effected by aconitine (English and German), brucine, conine, digitaline, nicotine, strychnine, papaverine, narceine, codeine, and, in accordance with the statements of the named chemists, veratrine. To these may also be added picrotoxin (in neutral solution), while atropine produced no reduction.

If it be accepted that the ptomaines which, accordiug to a recent investigation of A. Casali ("Gazz. chim.," 1881, p. 314), are considered as amido acids, possess a stronger property of reduction than most alkaloids, it is seen from the communicated experiments that a distinguishing reaction between plant poisons and ptomaines with regard to their behavior towards potassium ferricyanide cannot be observed.

The author finally mentions that he is still occupied with the examination of the crystalline, or amorphous precipitates, which are produced by potassium ferricyanide and ferrocyanide with the alkaloids mentioned.—*Archiv der Pharm.*, Feb., 1882 pp., 104—106.

The Prsence of Ptomaines in the Inferior Animals. By M. Schlagdenhauffen.—The author reviews the history of the important discovery of this class of organic poisons by the Italian chemists Moriggia and Battistini, in 1875, which were also observed at about the same time by Selmi, Casali and Vella, and who called attention to their great importance in toxicology. More recently Brouardel and Boutmy, as also A. Gautier, have occupied themselves with the study of the formation of these bodies. According to the former, the ptomaines are the result of the putrid transformation of albuminous bodies. They

are most readily formed when the putrefaction takes place with exclusion of the air, and result from the union of certain hydrocarbons with the nitrogen proceeding from the tissues or from the animal liquids, while the oxygen of these materials and their carbon are dissipated in the form of carbonic acid gas. They may also be formed during life.

A. Gautier, whom Selmi was pleased to recognize as the first chemist to affirm the existence of ptomaines in putrefying matters, has expressed the opinion that they result from a division of the albuminoid matters. He has searched for them among the products of secretion of certain animals which are provided with special glands, and has confirmed their presence in the venom of reptiles.

Pursuing the thought of the physiological formation of these bodies, the question arose whether the salivary glands of the superior animals would not produce toxic substances, analogous to the venom of serpents, and has indeed found in normal human saliva, a very toxic substance, particularly in its action upon birds, with which it produces intense stupefaction. It consists principally of a venomous alkaloid, forming a soluble and uncrystallizable chloro-platinate and chloro-aurate, of the nature of the cadaver alkaloids.

Based upon the interesting results of Gautier, the author has sought to disclose the presence of ptomaines in the inferior animals, selecting the comestible oyster and the common mussel as the subjects for experiment.

The animal, after having been detached from the shell, was deprived of the larger part of the tissue, in order to retain simply the central organ, the stomach and liver, upon which the experiments were made. The material was rubbed in a mortar with sand, which latter had been previously washed with acid and strongly ignited, and finally the organic material, after complete desiccation in a bath of salt water, introduced into an apparatus for continual displacement, and treated with hot ether. The etherial liquid, evaporated to the consistence of an extract, contained a notable quantity of fatty matter mixed with chlorophyll, the presence of which was easily disclosed, either by the aid of the spectroscope or by means of concentrated hydrochloric acid. The etherial extract was then extracted with water, without the addition of an acid.

The aqueous solution, evaporated to a convenient quantity, presented all the characters of the cadaver alkaloids. It gave a yellowish-white precipitate with potassio-mercuric iodide and potassio-cadmic iodide.

Iodine in potassium iodide and the double iodide of bismuth and potassium, produced brown precipitates. Picric acid, phospho-molybdate of sodium, and tannin produced, likewise, abundant precipitates. Pottassium ferricyanide, in contact with ferric chloride, gave rise to the formation of Prussian-blue. Its hypodermic injection produced in the frog a stupefying effect, but without causing death.

These characters agree with those of the ptomaines; and the author concludes from the above reactions, that shell-fish contain bodies analogous to the vegetable alkaloids.

As to their origin, the author considers it difficult from the preliminary experiments to attribute their formation to a division of the albuminoid matters of the tissue, for nothing peremptorily demonstrates it; one would be able to refer them perhaps to a transformation of the alimentary bodies.

It would not be without interest to examine whether the production of ptomaines in animals is more abundant under certain physiological conditions than in others, or whether the toxic action of these bodies is more pronounced in summer than in winter. It is in order to elucidate this question that the author proposes to return again to the subject, after having investigated the reason, which is still the subject of controversy, why the consumption of oysters and mussels at certain seasons of the year is attended with danger.—*Journ. de Pharm. d'Alsace-Lorraine*, March, 1882, pp., 53—55.

The Venom of Human Saliva.—Gautier, as stated in the preceding article, has made the very interesting observation that the venom of serpents only appears to differ from human saliva, by the intensity of its effects, rather than by its nature, and it is therefore not unreasonable that particular danger is generally attributed to the bite of a man. Gautier has demonstrated his assertions as follows: 20 grams of normal saliva were evaporated in a bath of salt water; after lixiviation and successive clarification there remained in the capsule a product resembling an alkaloid, and weighing, for the amount of material indicated, 10 centigrams. A solution of this substance, injected under the skin of a bird, produced remarkably toxic effects. Almost immediately after the injection the bird was seized with trembling, staggered, and fell to the earth in a state of coma, or complete stupor, which was terminated by death in the course of half an hour, or one hour after the injected dose and following the rigor of the little animal. The phenomena resembled completely those of

the bite of a venomous serpent, and the substance consists principally of an alkaloid of the nature of the cadaver poisons or ptomaines, with which it agrees in its chemical reactions. This discovery, as Acart has remarked in a notice on the subject, may modify very much the question of virulent diseases; for that which in the one case is the result of the infiltration of bacteria may be in the other a simple substitution of chemical compounds. In any case it is certain that a virus is not here in question; for under the influence of elevated temperatures the virus is destroyed, while in submitting this salivary alkaloid to a temperature above 100°C. its toxic property was not diminished. In order to give greater weight to the facts which he has submitted, Gautier has studied the comparative action of the venom of one of the most formidable serpents of India, the *najans tripudians,* or better known as the cobra. This venom when injected in the dose of one milligram, dissolved in a quarter of a cubic centimeter of water, under the skin of a little bird, such as a chaffinch or sparrow, produced death in from five to twelve minutes. There was to be observed torpor, coma, then a period of excitement with convulsive movements and tetanic contractions. *Ibid.*, Jan., 1882, pp. 12, 22; from *La Nature.*

Preparation of Nitroglycerin.—Boutmy and Foucher have recently been awarded by the French Academy of Sciences the prize of 2,500 francs for their new and safe method of the preparation of nitroglycerin. The process consists in combining the glycerin with the sulphuric acid so as to form the glycerin-sulphuric acid, and decomposing the latter, slowly, by means of nitric acid. Two solutions are thus prepared: the glycerin-sulphuric acid and the sulpho-nitric acid, the latter being formed by the mixture of equal parts of sulphuric and nitric acids. These mixtures give rise to the emission of a large amount of heat, which necessitates the employment of refrigerating mixtures. In finally mixing these acids in convenient proportions, a reaction is produced which continues about 20 minutes. The nitroglycerin is deposited at the bottom of the vessel, and may be readily collected and washed. According to the old process, the reaction was rapidly accomplished, and a portion of the nitroglycerin arose to the surface, which rendered the operation of washing difficult.—*Ibid.*, March, 1882, p. 52.

Estimation of Ergot in Bread and Flour. By Dr. Pöhl.—The author communicates the following ready method for the quantitative

estimation of ergot in rye flour and bread: 15 grams of the flour, or well dried bread are digested with 30 cubic centimeters of ether, to which 15 drops of dilute sulphuric acid (1:5) have been added. The etherial solution is filtered, the flour washed upon the filter with ether, until 30 cubic centimeters of filtrate are obtained, and to the latter 20 cubic centimeters of a cold saturated solution of sodium bicarbonate are then added, whereby the reddish-violet coloring matter of the ergot passes into the aqueous solution, which may be removed by means of a separatory funnel. For the comparative colorimetric estimation two artificial mixtures of flour and ergot are prepared, one of 5 per cent. and the other of 1 per cent., which are then subjected to the same treatment.—*Pharm. Ztschr. für Russl.*, No. 20., p. 933.

Crystallized Hyoscyamine.—Duquesnel has succeeded in obtaining this alkaloid in a crystalline form. The pure sulphate was digested for a long time in the cold with calcium carbonate, the mixture triturated with sand, and dried over sulphuric acid. After having been powdered, the alkaloid was then extracted, by means of dry chloroform, when it crystallized upon evaporation at a very slightly elevated temperature in beautiful stellately grouped prisms. Whether hyoscyamine is identical with the other mydriatic alkaloids remains at present undecided.—*Chem. Zeitung*, No. 7., 1882, p. 124; from *Journ. Pharm. Chim.*, Febr., p. 131.

On the Decomposition of Pilocarpine.—According to Chastaing, this alkaloid is decomposed by heating with caustic potassa into carbonic acid, butyric acid, methylamine, and traces of acetic acid, according to the equation:

$$C_{11}H_{16}N_2O_2 + 5H_2O = CO_2 + 2C_4H_8O_2 + 2CH_5N + O.$$

Occasionally, and especially when the pilocarpine has been previously treated with fuming nitric acid, bases of the pyridine series are also formed.—*Ibid.*, No. 10., 1882, p. 184; from *Compt. rend.*, 94, p. 223.

Examination of Chocolate. By E. Herbst.—For the estimation of the sugar the chocolate, which has been previously deprived of fat, is extracted with boiling 50 per cent. alcohol as long as a brown-red color is imparted to the latter. The solution is evaporated to dryness, the residue taken up with water, the ensuing solution evaporated, and the residue dried at a 100°C., in a current of illuminating gas, and calculated as sugar. The mass deprived of fat and sugar is then dried

and weighed. On an average the pure cacao mass contains 50 per cent. of fat, and the amount of fat must, therefore, be nearly equal to half the weight of the chocolate, minus the amount of sugar. By the estimation of the ash, which should not amount to more than 2 per cent., mineral adulterations may be detected, while flour, chicory, acorns, etc., may be recognized, by a microscopical examination. *Ibid.*, No. 12, 1882, p., 222; from *Bad. Gew. Ztg.*, 15, p. 65.

The Detection of Tin with Arsenic. By Patterson Muir.—The precipitated sulphides of the arsenic group are warmed with hydrochloric acid, the insoluble residue tested for arsenic, and $\frac{3}{4}$ of the solution boiled with copper turnings for ten minutes. The stannic chloride is thereby converted into stannous chloride, which first reduces mercuric chloride to calomel, and soon to gray, metallic mercury. The rest of the solution may be tested in the usual way for antimony.—*Ibid.*, p. 222; from *Chem. News*, 45, p. 69.

CHIA SEED.

By Hiland Flowers, Ph.G.

Read at the Pharmaceutical Meeting, April 18th.

The Chia seed is obtained from the Salvia hispanica or Salvia Chian, a plant which grows in the northern States of Mexico, and is a species of the Sage genus.

The seed is a small one, about the one-sixteenth of an inch in length and about the one-twenty-fourth of an inch in width; it is oblong-ovate, somewhat flattish, nearly cylindrical, but both ends rounded and slightly tapering; the thinner end has a small, dark line forming a slight projection which is the eye of the seed, and this, when exposed to moisture, opens in a star-shaped or scalloped manner, emitting the growing embryo; below this eye are oil cells.

The seed is smooth and glossy, and is surrounded by a transparent epithelium, swelling very largely when in water. The testa is darkish-gray, striated with dark brown lines, running diagonally, and dotted, forming a very beautiful variegated surface; when pressed or crushed under a spatula it bursts at the hilum, exposing the cotyledons and the oil cells, leaving an oily stain upon the paper or other surface. Internally the testa is dark, grayish-brown, perfectly smooth, glossy, and devoid of the external variegations or striæ. The seed contains the

embryo with the radicle pointing towards the hilum, and a white, oily mucilaginous substance, much resembling unrendered fat.

The seed swells to about twice its natural size in water and yields to it very readily and largely its mucilaginous properties forming a thick solution. When treated with hot alcohol a solution is obtained which becomes cloudy on cooling and forms white scales with globules of oil on the side of the vessel and a clear pale-yellowish bland oil at the bottom; with ether the same substances are obtained with more of the white sediment; this, when treated with solution of mercury and nitric acid, acquires a reddish-brown tinge. The mucilage is coagulated by solution of more chloride; and when the seeds are immersed in a weak solution of iron they refuse to yield their mucilaginous substance and become at once surrounded with a congealed mass; the mucilage, when treated with tincture of iodine, gives no characteristic blue color. The whitish sediment obtained from the ether solution, when mixed with potassa solution, and heated, becomes flocculent. The pale-yellowish bland oil from the hot alcohol and other solutions has a taste much resembling nut oil containing a trace of flaxseed oil; and when secured by expression is of a much darker color, though somewhat lighter than the linseed oil, which it greatly resembles, both in odor and taste; when the oil is boiled long it becomes of a deep dark-brown color and more marked in its similarity to that of linseed thus treated. From my experiments it seems probable that this oil would equal that of the flax if not surpass it. Some of the oil left in a capsule for several days dried well, leaving a thin coating as is noticed in other oils of like nature.

The seeds are inodorous when whole, when crushed of an oily odor, and of a mucilaginous oily taste very much like ground flaxseed. The seeds are used, to quote from correspondence, to a large extent by the natives and foreigners for the preparation of a refreshing drink for the sick. This is prepared by adding a tablespoonful of the seed to a tumblerful of cold water, and after half an hour it is ready; generally it is sweetened and flavored with orange-flower water. This mild and cooling beverage will be found very efficient in fevers when great thirst usually troubles the invalid. Its demulcent properties are well known and highly valued by those who have used it; and the practitioner will find the Chia seed a mild auxiliary and valuable emollient. I regard it as superior to flaxseed and as producing much better satisfaction.

When a mild injection is required, and in the earlier stages of venerial diseases, it is often advantageous, and proves of invaluable service in forming a vehicle. The mucilage will also be found of great benefit in throat affections as a gargle or wash, as it will tend to protect the inflamed parts from the miasmatic influence of the air when respiring, and it has been and is now used in ophthalmia. The properties and virtues of this seed, I believe, are worthy of investigation.

The mucilage should not be allowed to stand in open vessels longer than five or six days, as a thick whitish mould-like collection forms on top, and in preparing the drinks it will be found much preferable to renew each day.

The present cost of Chia seed to the consumer is about 60 cents per pound, but this can, I think, be lessened by cultivating the plant. At present I have some growing, and find it readily germinates in this climate; whether it will bear the northern climate remains for experiment.

New Orleans, La.

ON CHIA AND ALLIED SPECIES OF SALVIA.

By John M. Maisch.

Read at the Pharmaceutical Meeting, April 18th.

About seven or eight years ago the writer received a sample of so-called Chia seed, but was unable to learn that it was employed in the United States; recently, however, information has been received that it is used to a certain extent in the south-western States, and near the Pacific coast, and that it bids fair to attract attention in other parts. In addition to the information contained in the preceding paper by Mr. H. Flowers, the following referring to the history of this drug will prove of interest:

Guibourt, in "Histoire naturelle des drogues simples" (4 edit. II. 432), speaks of it as follows:

"The homœopathic physicians, doubtless with the view of having a particular medication, the elements of which are unknown or rarely met with, have often procured from distant countries substances, like which similar ones could have easily been found under their hands. Such is chia seed which is brought from Mexico, where it is produced by a species of sage (Salvia hispanica?). These seeds are smaller than

psyllium seeds, which they much resemble; under the magnifying glass they still more resemble very small ricinus seeds in shape as well as in their glossy and gray, mottled with brown, coat, and by which resemblance they are easily recognized. When immersed in water, they are quickly surrounded, the same as psyllium seeds, by a mucilaginous layer, similar to gum tragacanth, which, with the aid of heat, is divided or dissolved in water, forming a very soothing drink, which is neither insipid nor of a disagreeable taste, and is therefore well adapted, without any other addition, to be habitually used as a beverage for the sick. I believe that the seeds of quince and of psyllium could be employed in the same manner. Chia seeds sown at the école de pharmamie produced plants having a quadrangular stem, 35 centimeters high and nearly smooth in all its parts; the leaves are opposite and regularly 5 centimeters apart; the petioles are slender, 4 to 6 centimeters long; the leaves are rather thin, oval-lanceolate, regularly toothed, the largest being 10 centimeters long and 6 centimeters broad. In the axil of each leaf a small slender branch was produced, which did not develop, the plant perishing before producing flowers. The figure given by Gærtner of the small fruit of Salvia hispancia agrees completely with chia seed; but Gærtner places this species among those having no mucilaginous fruit, and cites as having mucilaginous fruits Salvia verbenaca, disermas, argentea, ceratophylla, æthiopis, urticifolia, canariensis, etc."

In nearly all other works on materia medica chia is not mentioned, or if enumerated it is doubtfully referred to Salvia hispaniea; but Wiggers, as well as Dorvault, gives this species positively as the origin. However, aside from the statement of Gærtner as to the non-mucilaginous properties of its fruit, its stem and leaves do not correspond with the description given above by Guibourt. Thus DeCandolle in Prodromus, vol. xii, page 308, enumerates the following characters:

Salvia hispanica, *Lin.* Stem herbaceous, erect, pubescent; leaves petiolate, ovate, acute, crenately serrate, narrowed or cuneate at the base, glabrous, etc. An annual herb, 1 to 2 feet high; stem thickish; petioles and nerves of the leaves whitish pubescent; leaves long petiolate, the limb 2 to 3 inches long, etc.

Kunth, in Synopsis plantarum, etc., collegerunt Humboldt et Bonpland, vol. ii, p. 70, gives a similar description, but states the stem to

be retrorsely pubescent and the leaves to be acuminate, with an acute base and pubescent.

In 1866 Guibourt published "Observations sur les productions du Mexique" ("Jour. Phar. Chim." August, p. 95 to 108), of which an abstract appeared in this Journal (1866, p. 497 to 503). In this paper *chia* is referred to Salvia hispanica and reference is made to an Essay on Mexican Materia Medica, printed at Puebla in 1832, in which a few lines are devoted to these mucilaginous seeds. Guibourt further states: "The seeds have been planted at the école de pharmacie, and the plant has grown to a height of 35 centimeters, but it has not flowered and there is still doubt about its specific characters; it would be interesting to collect the entire plant in its native country." The author also states that by pressure an oil is obtained which is used like linseed oil; but since it is rare and sold at a rather high price there is scarcely anything else used under the name of *aceite de chia* except linseed oil.

I have not found any later observations on this plant grown in Paris, and the above quotation propably refers to the experiment related in the "Histoire." This plant cannot be identical with Salvia hispanica, which is an annual and grows wild not only in Spain, but in other parts of Southern Europe, as well as in Jamaica, Mexico and tropical America. This belief is strengthened by the Farmacopea Mexicana, which quotes the plant as a new species and gives the following information:

"Chia. *Salvia Chian*, LaLlave. Chiantzotzolli, Mex.—Grows in the central table land of Mexico and is cultivated in various parts of the republic. The seeds contain, according to Sr. Oliva, starch, a drying oil and mucilage of the nature of gum tragacanth. Immersed in water they augment considerably in volume, and in this state, with the addition of sugar and lemon juice, furnish a refreshing drink; they are also used in cataplasms as an emollient. A seed placed under the eyelid is used by the people for the purpose of removing foreign bodies from the eye."

A similar use for the eye is popularly made of various more or less mucilaginous smooth seeds, for instance flaxseed, and the seed-like akenes of a number of species of Salvia are employed in the same manner. Redwood's Supplement to the Pharmacopœia states of *Salvia verticillata*, Willd., which is indigenous to Central Europe, that "the seeds put into the eye become mucilaginous and thus facilitate the extraction of anything that has got into it." In addition to this species,

Salvia verbenaca, Lin., *S. Horminum*, Lin., *S. viridis*, Lin., and perhaps other species of Southern Europe are mentioned in older works as being employed in like manner and the small fruit of which, or at least that of S. verbenaca, was formerly called *oculus Christi.*

The peculiar arrangement of the female reproductive organs of the Labiatæ renders it difficult to distinguish their fruit from a seed. Labiate plants have four distinct or, at the base, slightly united ovaries, which are situated upon a small disk, and from the centre of which, at the base, arise the styles, united into one column, which forks at its apex into the bifid stigma. The place of attachment to the disk is so contiguous to that of the style, and confluent with the latter, that in the ripe fruit there is apparently only one scar observable, the same as in seeds, and hence these plants have by former botanists, even by Linnæus, been mistaken for gymnospermous or naked-seeded. Chia is, therefore, a fruit, an akene or nutlet; it is 2 millimeters ($\frac{1}{12}$ inch) long and 1·2 millimeter ($\frac{1}{20}$ inch) broad; the gray, marbled with brown, epicarp is covered with a transparent epithelium, which in water expands into a tender tissue, composed of delicate elongated cells.

The mucilage contained in this tissue is probably identical with that of S. hispanica and S. verticillata, which was examined in 1844 by C. Schmidt ("Ann. Chem. Phar." li. 42), and found to be a carbohydrate, which may be converted into sugar. The medical properties of chia depend upon this mucilage, and are probably identical with those of the fruits of all salvias, from which water extracts no other constituent besides the one mentioned. *Salvia urticifolia*, Lin., of the Southern United States may probably deserve as much attention for this purpose as any of the other species; it grows in dry localities and hilly woods from Southern Maryland to the upper districts of Georgia, and westward to Alabama and Arkansas. Over 400 species of salvia being known, mostly indigenous to the warm temperate zone, and to subtropical and tropical countries, it is not unlikely that many of these will prove to be more or less perfect substitutes for those that for various causes have become better known in the past.

In a paper by Dr. Edward Palmer, on the plants used by the Indians of the United States (see "Amer. Jour. Phar.," 1878, p. 539 and 586), it is stated (*l. c.* 547) that *Salvia columbariæ* is the "chia of the Mexicans and Indians of Arizona and New Mexico," and in the Botany of California (vol. i. p. 599) Prof. Asa Gray states that "this is the chia of the aborigines." To the same species refers the following interesting

account by Dr. J. T. Rothrock, which is copied from "Report upon United States Geographical Surveys west of the one hundredth Meridian," vol. vi, p. 48:

"During the summer of 1875 my attention was called, while in Southern California, to a mealy preparation in popular use among the Indians, Mexicans and prospectors. On inquiry, I found it was called 'chia.' Further examination proved that it was furnished by the seeds of *Salvia Columbariæ*, Benth. The seeds are collected, roasted and ground, in the native way, between two stones. This puts it in the condition in which I first saw it. It is used as a food by mixing it with water and enough sugar to suit the taste. It soon develops into a copious mucilaginous mass, several times the original bulk. The taste is somewhat suggestive of linseed meal. One soon acquires a fondness for it and eats it rather in the way of a luxury than with any reference to the fact that it is exceedingly nutritious besides. It is in great demand among the knowing ones who have a desert to cross, or who expect to encounter a scarcity of water, and what there is, of bad quality. By preparing it so thin that it can be used as a drink, it seems to assuage thirst, to improve the taste of water, and, in addition, to lessen the quantity of water taken, which in hot countries is often so excessive as to produce serious illness. As a remedy it is invaluable from its demulcent properties, in cases of gastro-intestinal disorders. It also holds a place among domestic remedies, for the same purpose that flax-seed occasionally does with us, *i. e.*, a grain of the seed is placed in the eye (where it gives no pain) to form a mucilage by means of which a foreign body may be removed from the organ. I have found it of great service as a poultice. As a matter of archæological interest, it may be noted that quantities of this seed were found buried in the graves several hundred years old. This proves that the use of the seed reaches back into the remote past. Indeed, I find several allusions to the name Chia in the second volume of Bancroft's great work on the "Native Races of the Pacific States," pp. 232, 280, 347 and 360. *Chianpinoli* appears to have been made by the so-called Aztec races from corn which was roasted and ground as the Chia was. Chia was, among the Nahua races of ancient Mexico, as regularly cultivated as corn, and often used in connection with it. Indeed, it was one of the many kinds of meal in constant use and which appear to have gone then, as now, under the generic name of pinoli."

It seems to me impossible that this species should be identical with

Guibourt's plant, as will be seen from its description by Asa Gray, which is taken from the "Botany of California," vol i, p. 599:

Salvia Columbariæ, Benth. Minutely tomentose or soft pubescent; stem commonly slender, branching, and leafy below, a span to a foot or two high from an annual root, naked and peduncle-like below, terminated by a solitary or two proliferous head-like false whorls; leaves deeply once or twice pinnatifid or parted into oblong and crenately toothed or incised divisions, pointless, rugose, etc.

The species is indigenous to California, more particularly the southern part thereof, where it is common, likewise in Western Arizona, while in Nevada it appears to be confined to the Truckee Pass at an altitude of 4,000 feet ("Botany of the Geological Survey of the Fortieth Parallel," by Sereno Watson). I have found no account of its occurrence throughout Mexico.

Descriptions of fruits are rarely given in systematic botanical works, an omission which is frequently embarrassing to the student of materia medica. Most of the fruits of the Labiatæ do not differ very greatly in size and shape, and more or less similarity must be expected among those of the numerous species of Salvia; how many of these may agree in the color of their epicarp and in the presence of the mucilaginous epithelium it is impossible at the present time to say. But from what has been stated above, I think it must be concluded that at least several species have fruits resembling in appearance very small ricinus seeds, and that most likely such of them which are mucilaginous have been used by the aborigines under the name of *chia*, which would, therefore, have to be regarded as a generic term, applicable to all fruits of salvias, having the characters indicated.

FALSE BELLADONNA ROOT.

By E. M. Holmes, F.L.S.,

Curator of tho Museum of the Pharmaceutical Society of Great Britain.

In a previous paper attention was directed to the fact that the root of *Scopolio Japonica* was being imported from Japan under the name of belladonna root ("Pharm. Journ." [3], x., p. 789), and subsequently, at an Evening Meeting of the Pharmaceutical Society ("Pharm. Journ." [3], xii., p. 490), a specimen of another substitute for belladonna root, differing entirely from the Japanese drug, was exhibited. A few weeks ago some specimens of both these roots were sent to me

for identification from a provincial town. It appears desirable, therefore, as the false belladonna roots are to all appearance likely to be distributed through the country, to publish a figure of the false root and to give an account of the means by which it may easily be distinguished from the true belladonna root.

The root here alluded to has been identified by Professor Flückiger as that of *Medicago sativa*, and is stated by him to be sometimes met with on the continent as an adulterant of belladonna root.

In size and color the medicago root closely resembles that of belladonna, but differs in the following particulars:

The crown of the root is divided into 3 or 4 woody branches which are solid. The tap-root is hard and woody and broken only with difficulty. The outer surface is more or less covered with small scattered warts, and when scratched with the nail does not leave a white mark. The transverse section presents a woody structure and when it is wetted the cortical portion is seen to be of a white color with a yellowish meditullium traversed by a number of white medullary rays (Fig. *a*). When the transverse surface of the root is moistened a leguminous odor, somewhat resembling that of the pea, becomes perceptible, and the flavor is similar. The taste of the root is at first sweet like that of liquorice and afterwards bitter and somewhat acrid, irritating the fauces.

Root of *Medicago sativa*.—*a*, transverse section of root. *b*, transverse section of belladonna root.

Belladonna root is generally crowned with the *hollow* bases of the leafy stems, and the epidermis is easily scratched off by the nail, leaving a white starchy spot wherever abraded. The transverse surface of the root exhibits a narrow cortical portion of a yellowish or pale brown color, divided by a dark line from the large meditullium or central portion. The latter is also of a pale brown color, and shows, irregularly scattered through its substance, but more numerous towards the cor-

tical portion, a number of darker dots (Fig. *b*), which when examined through a lens are seen to be vascular bundles in which the openings of the large porous vessels are visible, the vessels being surrounded by a few wood cells which give the dark color to the dots. The taste of the root is starchy and slightly bitter, without subsequent acridity. The root breaks with ease. Both the medicago and the belladonna contain starch, the grains being much larger and more muller-shaped in belladonna, and forming sometimes duplex or triple granules; other granules appear circular or oblong oval, according to their position. In medicago the starch grains are somewhat similar, but smaller. There are also present in the latter root a number of linear-oval grains, presenting a well marked linear hilum. There is much less starch in the root than in belladonna, and the iodine test therefore gives a comparatively faint reaction. Neither root appears to contain tannin. The best marks by which to distinguish the medicago root therefore are the radiated structure of the meditullium, its woody character, and consequent resistance when an attempt is made to fracture it.

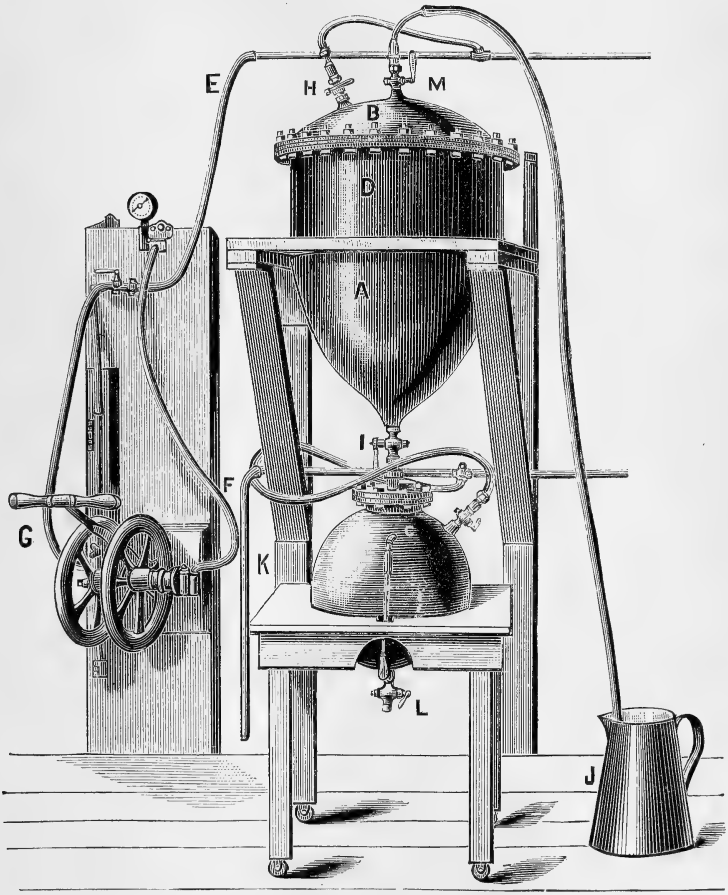
It may be added that the root was of German origin, and that those who wish for genuine root would do wisely to order the English grown drug, which is collected and prepared with more care.—*Farm. Jour. and Trans.*, March 11, 1882.

A NEW DISPLACEMENT APPARATUS.

By R. F. Fairthorne, Ph.G.

A somewhat novel and in some respects apparently very useful percolator has been brought to my notice, together with the manner in which it is employed, and some articles produced by using the same, that possess properties showing that they were well made; in fact, some of the fluid extracts were not only fair, but unusually good, and for this reason I thought that a description of the percolator and of the manner in which it is used might be as acceptable to others as it was to me. By referring to the annexed cut the use of each part will easily be understood. The shape of the percolator differs somewhat from the usual form, being to some extent egg-shaped, and articles packed in it are not so liable to become so compressed as to impede percolation, as is sometimes the case when the ordinary form of displacer is used which more nearly approaches the cylindrical form. The cover *B*, which is hemispherical in shape, is fastened unto the body *A*

of the displacement apparatus, by means of clamps with India rubber rings between to render it air tight. The drug to be operated on having been previously sufficiently moistened with the menstruum and packed is next exhausted of as much air as possible by a vacuum being produced through the upper part of the vessel, by means of an air



Percolator, with air pump.

pump *G*, which is connected with it by means of the tube *F*. The stop-cock *h* is next closed and *M* opened, connecting with the tube *E*, the end of which dips into the liquid to be employed as menstruum, and thereby a sufficient quantity of it is allowed to be drawn into the

displacer to cover the drug. The stop-cock *M* is then closed and the materials allowed to macerate for several days.

In order to start percolation, the receiver *C* is exhausted of air and the tap *i* having been opened the saturated fluid will begin dropping, and continue to do so, so long as the force of the vacuum in the receiver is equal or greater to that in the upper vessel. When it begins to stop, air is admitted above the drug which is drawn through the material, carrying with it much of the remaining liquid. To finish the operation air is forced into the percolator by means of the pump. Messrs. Smith, Kline & Co., of this city, who have adopted this apparatus for making fluid extracts, state that they find it works very satisfactorily and economically as so large a proportion of the menstruum used is recovered. As an instance in making fluid extract of Wild Cherry, when 80 pounds of the bark are used 80 pints only of liquid are employed and at least 75 pints are recovered.

From what is here stated it will be apparent that the superiority of this mode of extraction of those active ingredients, that the fluid extracts and tinctures should contain, depends chiefly upon two conditions to which the drug operated upon is subjected, namely, upon the effect produced by withdrawing the ordinary pressure of the atmosphere, not only on the surface of the material, but on each particle of the substance; a vacuum being thereby produced in each individual cell which is at once filled up upon contact with the liquid when it is admitted into the vessel, the menstruum under these conditions being enabled to penetrate much more quickly and readily the interior of each granule of the article operated upon.

The advantage of the other condition consists of exclusion of air, by means of the cover and retention of vapor of the fluids used in making the preparations, preventing thereby changes which might otherwise occur, both in the liquid and solid contents of the percolator.

As only such drugs are used that have been well dried, we can understand readily the difficulty with which many of them are exhausted by the usual process, when we take into consideration that each particle of the drug is composed of cells which, by desiccation, become partially empty, offering a certain amount of resistance to the entrance of liquids in somewhat the same manner that a piece of pumice-stone or pith of sassafras resist the penetration of water when thrown into it. Therefore, if a vacuum can be formed in these cells, fluids will much more readily surround and penetrate them.

In using this apparatus for preparing fluid extracts only one pint of menstruum for every sixteen ounces of the material is employed, and after the liquid has ceased to run into the receiver, more menstruum is added, just sufficient to produce a pint of the finished product. No evaporation of any portion of the tincture is required as in the officinal process.

By means of suitable iron pipes any number of percolators and receivers may be connected with a stationary air-pump, and after closing the stop-cocks of the others the air in any one vessel may be rarefied or compressed at pleasure.

SYRUP OF HYDRIODIC ACID.

By W. Gilmour.

An American preparation of hydriodic acid in the form of a syrup has lately been brought under the notice of medical men and pharmacists in this country, with the recommendation that the acid "is perfectly protected against decomposition—a result never before attained." Into the composition of this particular syrup, or its preservative medium, I will not at present enter, but I wish to point out that the statement here made, as also that in the recommendatory advertisement, that "simple mixtures of hydriodic acid and syrup do not keep," are only partially correct.

Nearly thirty years ago, when this preparation was first introduced, Mr. Murdoch, of Glasgow, showed that a syrup of this acid could be kept with ordinary care for an indefinite period. This is my own experience also. With attention to the conditions afterwards to be referred to, there is less trouble from decomposition with a syrup of this acid than there is with a syrup of any of the ordinary ferrous preparations.

It will probably be remembered by many that Dr. Buchanan, who was the first to bring this acid prominently under medical notice as a therapeutic agent, recommended that it should be prepared extemporaneously by double decomposition of concentrated solutions of iodide of potassium and tartaric acid. When prepared in this way the resulting liquid is of a bright yellow color, deepening quickly into a darker red, and giving abundant indications of the presence of free iodine within a very short time of its preparation. Mr. Murdoch attributed

this rapid decomposition to contact with the air from the agitation necessary to effect separation of the bitartrate precipitate. It probably, however, admits of another explanation. Should any one take the trouble to investigate the reaction between the two foregoing substances, they will find that the bitartrate precipitate is formed only to the extent of about one-half of the theoretical quantity, and further, that this is not entirely due to the solvent power of the hydriodic acid on the bitartrate precipitate, but is due also to the fact that there is not complete decomposition between the iodide of potassium and tartaric acid. In short, the phenomenon here is very similar to that quite recently pointed out as taking place in the preparation of Fothergill's hydrobromic acid. The resulting product is consequently neither uniform nor stable in its nature, so that a syrup prepared from it can scarcely be depended upon for uniformity of strength or keeping properties. Along with this there was probably one other circumstance that militated against the keeping properties of the earlier preparations, viz., their strength. If I remember rightly, the strength of the solution as proposed by Dr. Buchanan was as near as possible an equivalent of 5 grains iodine to each fluiddrachm, while the syrup as proposed by Mr. Murdoch contained 2 grains iodine in the same quantity. Now it may be pointed out that the keeping properties of the syrup depend to a great extent upon these two things, namely, the acid strength of the syrup and the density of the syrup. Two ounces, for example, of an aqueous solution of the acid, containing an equivalent of 5 grains iodine to each drachm, was exposed in a capsule, and began to decompose in one or two hours' time; in 12 hours the presence of free iodine was quite visible, and in three or four days the whole of the iodine was set free. On the other hand, the same quantity of a syrup of similar strength, and of density 1·320, was exposed under the same conditions, and in three or four days it had only assumed a slightly deeper straw-colored shade. At the end of this time it had thickened considerably, owing to evaporation, and it ultimately got into a kind of pasty mass in which condition, so far as my experiments have gone, it is practically stable. A syrup of density 1·180 (about half the sugar strength of the foregoing) will slowly decompose after a few days' exposure, but the rate at which decomposition takes place will depend upon the acid strength, a stronger preparation decomposing much more quickly than a weaker. I have prepared and exposed syrups of various strengths and densities, and

all the experiments tend towards the same conclusion, so that there is reason in the weaker strength of the syrup now being advertised. Glycerin, it may be stated, has little restraining effect on the decomposition, probably owing to its hygroscopic properties.

As to the best manner of preparing the acid, I have tried nearly all the methods, and in the end have always come back to the decomposition of sulphuretted hydrogen with free iodine as represented by the following equation: $2H_2S+2I_2=S_2+4HI$. Decomposition of iodide of barium with sulphuric acid might afford a suitable means of obtaining it, were it not for these two objections, namely, that it necessitates the personal preparation of the iodide of barium, and, second, the distillation of the product after decomposition. The methods recommended in text-books of decomposing iodide of potassium with iodine and phosphorus in the presence of a small quantity of water, or of distilling the acid from iodine and phosphorus in the presence of a large quantity of water, are both unsatisfactory. In the first case there is always more or less of an element of risk, and, moreover, the strength of the finished product requires in every case to be estimated; while the second method has always proved in my hands an admirable one for obtaining a variety of compounds of which phosphoretted hydrogen may be taken as typical. In preparing a stronger solution, say of four or five grains iodine to each drachm, by the sulphuretted hydrogen process some little difficulty may at first be experienced in effecting complete decomposition of the iodine. The iodine is not soluble to any extent in water, nor can it conveniently be kept suspended in the water so as to allow the sulphuretted hydrogen to act upon it. If put, therefore, into the bottle through which the sulphuretted hydrogen gas is being passed, it simply lies at the bottom, the particles shortly adhere and form a plastic mass; this in turn soon becomes coated with sulphur, and practically the iodine ceases to dissolve. To obviate this I take advantage of the solubility of iodine in both hydriodic acid and sulphuretted hydrogen, and instead of passing the gas *on to the iodine* I pass it *through the iodine solution*. To do this without waste, two bottles are required, the one being attached to the gas generator and the other preparing for it. The iodine (in a glass mortar) is rubbed down with the solution from the sulphuretted hydrogen generator until it is saturated, when it is again transferred to the generator and the other withdrawn from it, in turn to be saturated with the iodine. In this way the process can be carried on with the least waste either of time or material.—*The Chemist and Druggist*, February 15, 1882.

PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR.

Purification of Naphthalin—Crude naphthalin is fused, well mixed with sulphuric acid (such of 60° is sufficiently strong), and afterwards with 5 per cent. of finely-powdered black oxide of marganese gradually added. After 15 or 20 minutes the mixture is cooled, the naphthalin is repeatedly melted with water and with weak soda solution, and finally distilled. Other oxydizing agents may be used in place of manganese. Thus purified, naphthalin remains perfectly white.—*Rep. Anal. Chem.*, 1881, No. 21; *Phar. Centralh.*, 1882, No. 3.

The Origin of Benzoic Acid is best determined, according to O. Schlickum, by the peculiar empyreumatic odor. Pure benzoic acid does not reduce potassium permanganate; if a reduction takes place it is usually due to cinnamic acid. The reaction is best performed with the free acid or in the form of sodium salt, but not with a boiling alkaline liquid which is apt to cause a reduction from various causes. If 0·10 gram of benzoic acid or its sodium salt is agitated with 5 grams of water and after the addition of 10 or 15 drops of one-tenth per cent. solution of potassium permanganate the color of the latter is discharged, the benzoic acid has most likely been prepared from Siam benzoin. If a red tinge is permanently produced by 3 or 4 drops of chameleon solution, the acid was probably artificially prepared from toluol; if such an acid be resublimed in the presence of a small quantity of benzoin, the product behaves nearly the same as the acid obtained from Siam benzoin. The mixed silver salts of cinnamic and benzoic acid may be separated by boiling water, in which the silver cinnamate is insoluble.—*Phar. Zeitung*, 1882, p. 24. See also *Am. Jour. Phar.*, 1882, p. 56.

Preservation of Ergot.—Emil Perret directs the ergot to be bruised, and dried at 40°C., then powdered and dried at 80°C., then in a percolator exhausted with strong ether, after which the powder is dried at 35°C. for several hours, the heat being afterwards raised to 40, to 60, to 80 and for a few moments to 100°C. (See also "Amer. Journ. Pharm." 1881, p. 457.) The powder kept in vials, retains a little ether, which after six months, is given off on heating to 110 or 115°C.—*Bull. gén. de Thér.*, March, 1882, p. 202 to 204.

Stanislas Martin (*Ibid.*, p. 245) directs attention to the fact that as

early as 1839, it had been recommended to wash ergot with alcohol previous to pulverizing it, but that the proposition had been opposed by Soubeiran, and that last year Baudrimont opposed the official recognition of powdered ergot by the new Codex. Insects are not the sole cause of the deterioration of ergot, and it still remains to be proven whether ergot which has been kept for a long time in the state of powder has preserved its medicinal properties unimpaired.

Simple Syrup, if prepared from refined sugar with distilled water or with water free from lime, according to Lacombe, does not need clarification with albumen to become clear; while on the other hand ordinary water, containing lime yields a turbid syrup, requiring clarification.—*L' Union Phar.*

Vinum Condurango.—Dr. Albert Hoffmann of the Medical Clinic of Basel again calls attention to condurango of Ecuador as a useful remedy in cancer. Of 20 cases treated with it improvement was noticed in 40 per cent., uncured 10 per cent., and died 50 per cent. The most advantageous form of administration was the wine, prepared as follows: 2½ kilos of coarsely powdered condurango bark are macerated for 2 days in 10 liters of cold water and the infusion strained; the residue is again mixed with 10 liters of cold water, boiled for an hour, allowed to cool and again strained; the residue is treated for two days with 5 liters of alcohol, expressed, the alcohol distilled off, the residuary liquid mixed with the aqueous liquids and the whole evaporated to the consistence of an extract which is to be dissolved in 2½ liters of Malaga wine, decanted from the sediment and filtered. This preparation has an agreeable bitter taste and is readily taken by the patients. Prepared with condurango from Venezuela it has, however, an acrid peppery taste and is either not taken by the patients or does not agree with them.—*Schweiz. Woch. f. Phar.*, 1882, No. 4.

Wash for Fissures from Frostbites.—Borax 4 grams, rose-water 200 grams, glycerin 50 grams, tincture of tolu 10 grams; mix.—*La Presse Méd.*, Feb., 1882, p. 30.

Disinfecting Liquid, Fonssagrives'.—Dissolve ferric sulphate 500 gm., and phenol 1 gm., in 10 liters of water. *Revue de Thérap.*, March, 1882, p. 163.

Carbolic tablettes are prepared by G. Schweitzer by intimately mixing 20 parts of powdered talc with 50 parts of plaster Paris and 10 parts of carbolic acid; sufficient water is then added to form a mass which is poured into small paper capsules prepared for the pur-

pose. The mass soon becomes hard; each tablette is then wrapped in paper and tinfoil and the whole preserved in a tin box. For use, the wrapper is removed and the tablette placed in a suitable place in a room, in which a pretty strong odor of phenol will be perceptible for 10 or 15 days, according to the temperature.—*Jour. Phar. d' Als.-Lorr.*, March, 1882, p. 56.

Collyrium of the Benedictines.—Hager publishes the following formula: Powdered soot 100 gm. is digested for several hours with water, 250 gm. Filter, evaporate to dryness and dissolve in acetic acid of 1·040 sp. gr., and distilled water each 100 gm.; alcohol, 50 gm.; add extract of hundred-leaved rose petals, 10 gm., previously dissolved in rose-water, 50 gm; macerate for a day and filter.

This collyrium is much employed in France, particularly in the southwestern part thereof, and is said to be particularly useful in scrofulous affections. For use, 20 or 30 drops of it are added to a wine-glassful of lukewarm water and this is applied to the eyes by means of linen.

Another formula directs 200 gm. of good wine to be used in place of the distilled water, rose-water and alcohol.—*Phar. Centralhalle*, 1882; No. 10, p. 112.

The formula given by Dorvault directs extracting 60 gm. of soot, with boiling water, filtering, evaporating to dryness, dissolving in a sufficient quantity of strong vinegar, and adding for every 75 gm. of this liquid 1·2 gm. of extract of rose-petals.

Cosmetic Wash, Startin's.—Dissolve borax, 10 gm., in orangeflower-water 1 liter, and add glycerin 50 gm.—*Revue de Thérap.*, March, 1882, p. 165.

OPIUM ASSAY.

Flückiger's Process Modified by E. R. Squibb.

Take of opium in its commercial condition 10 grams = 154·32 grains.

If commercial powdered opium is to be assayed for morphia it should not be dried, but should be weighed for the assay in the condition in which it is found in the market, and in which it is to be dispensed.

If commercial moist opium is to be assayed for morphia, the taking of the sample for assay is a matter of great importance, because it is highly probable that, unless by accident, no two lumps of a case are of exactly the same morphia strength. Hence it is that assays of moist

opium are at best only close approximations, though sufficient for practical purposes.

About every tenth lump of a case should be sampled by cutting out a cone-shaped piece from the middle of the lump, with an ordinary pocket knife. Then from the side of each cone a small strip is taken from point to base, not exceeding say half a gram from cones which would average 10 to 15 grams, and the cone is then returned to its place in the lump. The little strips are then worked into a homogeneous mass by the fingers, and the mass is then wrapped in tin-foil, moist cloth or paper, to prevent drying, until it can be weighed off for assay. When opened to be weighed off, it is best to weigh at once three portions of ten grams each. In one portion the moisture is determined by drying it on a tared capsule until it ceases to loose weight at 100°C. = 212° F. Another portion is used for immediate assay, and the third is reserved for a check assay if desirable.

Put the weighed portion into a flask or common wide-mouthed vial of 120 cc. = 4 fluidounces capacity, tared and fitted with a good cork. Add 100 cc. = 3·3 fluidounces of water,—distilled water by preference, but this is essential only when common water contains an unusual amount of inorganic matter—and shake well. Allow it to macerate over night, or for about 12 hours, with occasional shaking, and then shake well and transfer the magma to a filter of about 10 centimeters = 4 inches diameter, which has been placed in a funnel and well wetted. As it is the shaking which accomplishes the object here in view, rather than the standing, the time of maceration can be easily shortened even to three hours, if the shaking be frequent and active.

As rare exceptions, some powdered opiums will be found which through natural conditions give a magma with water which will not filter, or filter so very slowly that the water solvent becomes impracticable. When this is discovered, the magma is thrown away and a fresh portion of powder is taken. Wash this by agitation in the bottle with 30 cc. = 1 fluidounce of ether (s. g. ·728), transfer it to a filter, rinse the bottle with 20 cc. = ·66 fluidounce more ether, and pour this into the opium in the filter. When this has passed through, wash the filter and opium with 10 cc. = ·33 fluidounce more ether applied drop by drop around the edges of the filter and on the surface of the opium. Then dry the powder on the filter and use it as in the case of opium which does not need to be first washed with ether.

Opium which is adulterated, or standardized by admixture with dextrin, gums, sugar or glucosides, yields an impracticable magma with water, and ether washing to such does little or no good. All such samples have to be exhausted with an alcoholic solvent. If not much adulterated a mixture of equal measures of alcohol (s. g. ·820) and water will answer best, but generally a mixture of two measures of

alcohol (s. g. ·820) with one measure of water is to be used instead of water alone, for the exhaustion, and as this mixture is not as good a solvent for the morphia salts in the opium as water, more of it is required, and the washing and percolating should be carried to 250 cc. = 8·33 fluidounces of solution from the 10 grams = 154·32 grains of opium. The process after exhaustion is the same as where water is used as the solvent.

Filter off the solution into a tared or marked vessel and percolate the residue on the filter with water dropped onto the edges of the filter and the residue until the filtrate measures about 120 cc = 4 fluidounces, and set this strong solution aside. Then return the residue to the bottle by means of a very small spatula, without breaking or disturbing the filter in the funnel, add 30 cc. = 1 fluidounce of water, shake well and return the magma to the filter. When drained rinse the bottle twice, each time with 10 cc. = ·33 fluidounce water, and pour the rinsings upon the residue. When this has passed through, wash the filter and residue with 20 cc. = ·66 fluidounce of water, applied drop by drop around the edges of the filter, and upon the contents. When the filter has drained, there should be about 70 cc. = 2·33 fluidounces of the weaker solution. This (120 + 70 =) 190 cc. = 6·33 fluidounces of total solution will practically exhaust almost any sample of 10 grams = 154·32 grains of opium. But occasionally a particularly rich opium, or one in coarse powder, or an originally moist opium which has by slow drying become hard and flinty, will require further exhaustion. In all such cases, or cases of doubt, the residue should be again removed from the filter and shaken with 30 cc. = 1 fluidounce of water, and returned, and be again washed as before. The filter and residue are now to be dried until they cease to lose weight at 100°C. = 212°F. If any residue remains in the bottle, the bottle is also to be dried in an inverted position and weighed. Evaporate the weaker solution in a tared capsule of about 200 cc. = 6·66 fluidounces capacity, without a stirrer, on a water-bath until reduced to about 20 grams = 309 grains. Now add the 120 cc. of stronger solution, thereby subjecting this portion to the shortest practicable heating with least injury to the alkaloid—and evaporate the whole again to about 20 grams = 309 grains. Cool the capsule and contents, and when cool add 5 cc. = ·17 fluidounce of alcohol (s. g. ·820) and stir until a uniform solution is obtained, and no extract adhering undissolved on the capsule. If this solution should contain an appreciable precipitate, as from rare specimens of opium it will, it must be filtered, and the

filter be carefully washed through. Then the filtrate must be evaporated to 25 or 30 grams. Pour the concentrated solution from the capsule into a tared flask of about 100 cc. = 3·33 fluidounces capacity, and rinse the capsule into the flask with about 5 cc. of water used in successive portions. Then, if the solution has not required filtering, add 5 cc. = ·17 fluidounce more of alcohol. If it has been filtered and evaporated add 10 cc. = ·33 fluidounce of alcohol and shake well. Then add 30 cc. = 1 fluidounce of ether, and again shake well.

This shaking together first of the watery solution and alcohol causes the alcohol to combine with the water before the ether is added. The ether then added, the second shaking saturates the watery solution and combined alcohol with ether, and then the mixture is ready for the precipitation of the alkaloid under the most favorable condition.

Add now 4 cc. = ·133 fluidounce of solution of ammonia, of 10 per cent. (s. g. ·960) and shake the flask vigorously until the crystals begin to separate. Then set the flask aside in a cool place for 12 hours, that the crystallization may be completed.

This shaking secures the crystallization in very small crystals, so as to be easily washed and not adherent to the flask. The crystals will then be found partly at the bottom of the flask and partly in the ether at the surface of the lower dark, watery solution. If the shaking be frequent and vigorous, two or three hours' time will be sufficient to complete the crystallization, or if it be continuous, half an hour will be sufficient, but as a general rule it is better to allow the flask to stand over night. When there is no haste, a very good method is to macerate the opium over one night—prepare the solution during the day, and allow the second night for completing the crystallization. Then finish the assay on the second day. If there be haste, however, the assay may be completed iu one day by the vigorous and frequent shaking above indicated. Indeed, maceration without agitation or percolation is comparatively useless after the powder to be exhausted becomes completely saturated; and crystallization in a dense liquid like this is very slow if convection or liquid diffusion be depended upon; but agitation brings all parts of the liquid so thoroughly in intimate contact, that an half-hours' vigorous agitation must be fully equal to twelve hour's standing without agitation.

Pour off the ethereal stratum from the flask, as closely as possible, onto a tared filter of about 10 centimeters = 4 inches in diameter, well wetted with ether. Add 20 cc. = ·66 fluidounce of ether to the contents of the flask, rinse round without shaking, and again pour off the ethereal stratum as closely as possible onto the filter, keeping the funnel covered. When the ethereal solution is nearly all through,

wash down the edges and sides of the filter with 5 c.c. = ·17 fluidounce of ether, and allow the filter to drain with the cover off. Then pour on the remaining contents of the flask and cover the fuunel. When the liquid has nearly all passed through, rinse the flask twice with 5 cc. = ·17 fluidounce of water each time, pouring the rinsings with all the crystals that can be loosened onto the filter, and dry the flask in an inverted or horizontal position, and when thoroughly dry weigh it. Wash the filter and crystals with 10 cc. = ·33 fluidounce of water applied drop by drop to the edges of the filter. When drained, remove the filter and contents from the funnel, close the edges of the filter together, and compress it gently between many folds of bibulous paper. Then dry it at 100° C. = 212° F. and weigh it. Remove the crystals of morphia from the filter, brush it off and re-weigh it to get the tare to be subtracted. The remainder, added to the weight of the cryslals in the flask, will give the total yield of morphia, in clean distinct small light-brown crystals.

Take a small portion of these crystals, rub them into very fine powder and weigh off ·1 gram = 1·54 grain. Put this in a large test-tube fitted with a good cork and add 10 cc. = ·33 fluidounces of officinal lime water. Shake occasionally, when the whole of the powder should dissolve. (Absence of narcotine), (Flückiger.)

In pouring off the ethereal stratum from the flask as closely as possible, a little of the dark liquid and crystals will pass in with it, but this is of no consequence. The second portion of ether is added to dilute the remainder of the first, so as to get as much of it as possible separated before the watery liquid is poured into the filter, because this first ether contains all the narcotine and oily matters of the solution, and as the ether evaporates off from these they are deposited in the filter and with the morphia, and would be weighed with it. During this ethereal filtration the funnel is kept closely covered to prevent this evaporation and precipitation, but after the edges have been washed down with fresh ether, and the whole has passed through, there is so little of it left with the watery portion, and that little is so diluted that the whole may be poured on together. In adding the last or diluting portion of ether to the flask it is a little better to shake the whole contents together vigorously, but then it becomes necessary to wait a half hour or more for a complete separation before the ether can be poured off well. In pouring off this second portion, in order to leave as little ether as possible in the flask, it must be done very slowly, and toward the last, in order to get it close, a cubic centimeter or two of the dark liquid will pass out with it, but this is of no consequence, as it does not interfere with the ether filtration. The ether-wet filter does not

filter the watery solution rapidly, and with some opiums very slowly, indeed. And when this occurs the crystals are always darker and more likely to contain narcotine. When the filtration is so slow as to be impracticable, another assay must be made up to the point of the filtration. Then the filter must be wetted with water instead of ether, and the dark watery solution be filtered first. This is easily done by covering the mouth of the flask with the end of the finger and slowly inverting the flask. The dark liquid will then occupy the neck and can be let out slowly onto the filter to the last drop, leaving the whole ethereal liquid in the flask. The operator should be careful that no crystals remain on his finger. When the dark liquid has all passed through, the filter should be well washed with about 10 cc. of water, and be dried. Then the ethereal liquid and the remainder of the crystals should be poured on, and the flasks be well rinsed with ether and the rinsings be poured on the filter with as many of the loose crystals as possible. The filter should next be washed down with 5 cc. of ether and be again dried. Then the flask should be rinsed out twice with 5 cc. of water each time and the rinsings poured onto the filter, and the sides be finally washed down with water. It is very difficult to dry a substance completely in a flask if there be enough of the substance to form more than one thin layer of particles at any point, and, therefore, as few crystals as possible should be left in the flask. Usually, with good management, the quantity is only a few milligrams. The nearer to an inverted position that a flask can be placed without closing its mouth too much, the more quickly it will dry, because the heavier, moisture-charged air can then continuously run out and be replaced with dryer air. If the flask be not rinsed out with water last, a weighable quantity of ether residue will remain in it with the small quantity of morphia. After the filter has drained in the funnel, it will still contain a very considerable amount of liquid holding soluble matters which should not be dried with the morphia, hence the necessity of removing it from the funnel, folding its edges together as it was before it was opened, and placing it between folds of bibulous paper. If a light weight be laid upon the folds of paper and the filter, to keep a little pressure upon them, the paper will draw out as much of the washings as it can hold, and thus not only remove accidental matters in solution, but greatly facilitate the drying in a short time. The taring of the filter before using is not important, but is very useful as an indication of how well the filter and contents may have been washed, for the difference in tare before and after use shows how much weighable matter has been left in the paper when the water was evaporated off, and by inference how much was left in the morphia, though the amount in the morphia is of course much smaller than in the paper. This difference in the weight of the filter before and after use, in fair average opiums, will not exceed 4 or 5 milligrams, and should never exceed a centigram. Adulterated and mixed opiums usually give greater differences and give darker crystals.

In the weight of the crystals obtained, the moving of the decimal point of the metric weight one figure to the right, of course gives the percentage of morphia.

This process, according to the skill and care with which it is managed, will give uniform results to within two or three-tenths of a per cent., and will give a true account of the morphia in all unadulterated opiums probably to within a quarter of one per cent. and the results are believed to be too low rather than too high. Adulterated opiums, however, are much more difficult to assay and yield crystals which are always darker and less clean, and therefore the results are almost always too high. Poor opiums, on the other hand, are very easy to assay, and usually give very light colored clean morphia. The results here are liable to be too low, because when the quantity of morphia is small the alcohol and ammonia used are proportionately too large, so that much morphia may be retained in the mother-liquor. Therefore, when the morphia comes out very white and in small proportion, the assay should always be repeated, evaporating the solution to 10 grams instead of to 20, and adding 5 cc. of alcohol instead of 10, and 2·5 or 3 cc. of ammonia instead of 4.

The lime-water test for the narcotine in the results of the assay is quite sufficient, since nothing except coloring matter is so likely or so liable to be present as narcotine. The only difficulty is to know when the lime-water has surely dissolved all that it will dissolve. This is facilitated by having a very fine powder, and then good judgment is required to know the value or significance of undissolved residues when they are small.

The above process is very easily applicable to the assay of such preparations of opium as the tincture, deodorized tincture and compound solution. For the assay of these:

Take of the liquid preparation 120 cc. = 4 fluidounces. Evaporate at a low temperature to 10 grams = 155 grains, and from this point proceed exactly as in in the above process, using, however, 5 cc. of alcohol instead of 10 and 2·5 to 3 cc. of ammonia instead of 4.

This quantity of the liquid preparations is equal to about 150 grains, or a little less than 10 grams of the opium from which they were made, if made by the officinal process. The yield of morphia should be not much less than 1 gram = 15·43 grains, = 4 grains to the fluidounce, nor more than 1·5 gram = 23·15 grains = 5·8 grains to the fluidounce.

If the preparations were made by assay, and bear the assay value upon the label, then the yield of morphia should agree with the assay on the label within two or three-tenths of a grain to the fluidounce, or in proportion to the skill and success of the assay; but there will always be some loss.

Notwithstanding all the elaborate detail and repetitions with which the writer has, perhaps, overloaded this process, there are few who will be successful with it until after two or three trials; and the younger physicians and pharmacists upon whom must fall the responsibility of upholding the standards of the materia medica,—to whom these elaborate details are addressed,—should not be discouraged if very many trials be needed to render them expert enough to obtain tolerably accurate and uniform results.—*Ephemeris,* No. 1.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

Chelidonium majus contains, according to Haitinger, notable quantities of citric acid, besides the previously known chelidonic and malic acids.—*Monatsh.* Ch. ii, 485.

Lupinine is an alkaloid, recognized by Campani in the seeds of Lupinus albus. Betelli prepares it from the decoction of the seeds, by treating it with lime, concentrating the filtrate and exhausting this with ether. The alkaloid is precipitated by tannin and the chlorides of platinum and mercury, reduces gold solution and silver nitrate, crytallizes from benzol in needles, is dissolved from the alkaline aqueous solution by agitation with ether, benzol and chloroform, has a very bitter taste, and is poisonous to frogs, but apparently not deleterious to man, even if given in rather large doses.—*Gaz. chim.*, xi, 237, 240; *Phar. Ztsch. Russl.*, 1882. 31.

M'boundou or Icaja poison contains, according to E. Heckel and F. Schlagdenhauffen, only one alkaloid, strychnine, which is not colored red by nitric acid and is therefore free from brucine.—*Jour. Phys. Chim.*, v, 34; *Chem. Ztg.*, 1882, 27.

Abrus precatorius.—The seeds, which weigh on an average $2\frac{3}{16}$ gr., are poisonous. Prof. C. I. H. Warden did not succeed in isolating the poisonous principle, but obtained a white crystalline acid and an oil. *Abric acid* was obtained by exhausting the seeds with boiling alcohol; its formula appears to be $C_2H_{24}N_3O$; it is slightly soluble in cold, but dissolves in boiling water, crystallizing on cooling, and with bases forms well-defined crystalline salts. The physiological experiments gave the following results:

a. The mixture of half a seed with cold water, injected into a cat's thigh, produced fatal effects in from 18 to 30 hours. No effects were

apparent for 8 or 10 hours; then a gradual disinclination to move supervened, which slowly increased until the animal was unable to move; the respiration became shallower, the animal remained on its side and slowly died. No convulsive movements, diarrhœa or vomiting were observed.

b. The extract made with boiling alcohol was inert.

c. The residue, extracted with boiling alcohol, had no effect.

d. Abric acid and ammonium abrate are inert.

e. Neither the aqueous distillate of the seeds, nor the residue left in the retort, produced any symptoms.

f. The extract made with cold alcohol, by spontaneous evaporation, produced no effects.

g. The etherial extract produced fatal effects with the usual symptoms; in a second experiment no effects were produced.

It would appear that the temperature of 100°C. destroys the activity of the poison.—*Chemists' Jour.*, March 3; *Drug Reporter.*

Oxalis acetosella.—Dr. Edgar Eltinge reports in the "Annals of Anatomy and Surgery," that the expressed inspissated juice of this plant, properly formed into a suitable paste, has been successfully used by him as a local application in the removal of an epithelioma of the lip, after no especial good had resulted from the use of Canquoin's zinc chloride paste which had produced excessive hemorrhage. Three successive applications of the wood-sorrel paste, made at intervals of twelve hours each, were entirely sufficient to destroy the growth, the resulting eschar separating on the eighth day, leaving a healthy granulating surface, which healed rapidly. Not a drop of blood issued throughout, and at the end of two years there were no signs of recurrence. The pain produced by the application of the caustic was intense, demanding all the patient's fortitude to enable him to endure it; however, the duration did not exceed half an hour after each application.

Pure Olive Oil, nine parts, gently warmed with 1 part of nitric acid, sp. gr. 1·42, and then agitated until cold, yields, according to Conroy, in the course of one or two hours a straw-yellow solid mass, while the oils of cotton-seed and other seeds become deep orange colored and do not acquire the solid consistence of olive oil; five per cent. of seed-oils may thus be detected.—*Journ. de Mèd.*; *Zeits. Oest. Ap. Ver.*, 1882, p. 20.

THE MICROSCOPE: HINTS TO BEGINNERS.

By Robert Aitken.

As the microscope is becoming more and more an indispensable instrument to chemists and druggists, the following hints on its use, and a description of the various methods of mounting, may be of service to those desirous of becoming familiar with such a fascinating study as that of microscopy.

One or two remarks may be first made with regard to the choice of an instrument. First, the stand or base ought to be heavy, to prevent shaking; and, secondly, the field of vision should be quite free from color. If the microscope be not of first-class workmanship it may show a variety of colors round the edge of the field, thus rendering it useless for scientific investigation; but if a microscope is purchased from a good maker there is little danger of finding these defects. Another and very important test is its clearness of definition. This is usually tested by some special object, and a very good one is a diatom, one of those very minute vegetable organisms which require a high power to bring out the markings on the siliceous envelope.

Presuming that a satisfactory instrument has been obtained, with directions for working the accessory apparatus, I will now describe the methods of dissecting and mounting the different vegetable tissues. This branch of microscopy is chosen for several reasons, one of which is that students in botany take far more interest in vegetable histology if sections are seen with the eye, than from engravings shown in botanical works; and I therefore consider it a subject of great interest to those preparing for their examinations. Another reason is that specimens for such a study can be obtained all the year round with very little trouble.

Before proceeding, it will be necessary for the worker to have ready several glass slips with ground edges (these are to be preferred to the rough-edged slips, as the latter are liable to scratch the stage of the microscope), a dozen or two thin glass circles about ¾ inch in diameter, a razor, watch glass, and several fine-pointed needles, with handles made of cedar-wood, similar to those used for camel-hair pencils. It will be found advantageous to have one or two of the needles bent a little at the tips; this can easily be done by holding one in the flame of the spirit-lamp until it is red-hot, and then bending with a pair of pliers.

The worker having got together the above requisites can now proceed with the dissection of vegetable tissues. Procure a leaf of the ordinary laurel, or one of the spotted laurel (*Aucuba japonica*); with a pair of scissors cut off a portion, insert it, edge in, into a soda-water cork, which has been previously slit with a knife at one end; then hold the cork in one hand, and with the other take the razor, dip the blade in water, and shave off several slices of cork and laurel-leaf as thin as possible. A dozen slices may be cut while one's hand is in; then float them all into a saucer half filled with water, and with a needle select what seems the thinnest section of leaf, transfer this to the centre of a glass slip, put one or two drops of water over it, and then lower a glass circle gently over this; this

is done by holding the circle between the thumb and forefinger of the left hand inclined over the object, and letting it fall gently on the object with a needle held in the other hand.

Having thus temporarily mounted a section, transfer it to the stage of the microscope and first apply the 1-inch power and shallow eye-piece; this will give a general outline of the section, provided it has been cut sufficiently thin. Presuming that such has been obtained, it represents a vertical section of the laurel leaf, and will show the different shaped cells, and their arrangement with each other. This will be better observed if the $\frac{1}{4}$-inch power is used. The cells of the outer row corresponding to the upper blade of the leaf are tabular in shape, and look not unlike bricks and mortar; below these is seen another row of cells, ovoid in shape, and placed, as it were, on end. Within these cells green granules will be observed, surrounded by a mucilaginous fluid; this is chlorophyll, the fluid being the protoplasm, which sometimes gives a dimness to the object unless it has been sufficiently washed. Occasionally a cavity or blank space will be seen in a section of the leaf, having a small opening at the top; this is an air-chamber, and the opening above is a stoma. The above section may be taken as a fair example of the parenchymatous tissue. If it be desired to mount the specimen permanently, it had better be put for the present in some preservative fluid, such as a mixture of spirit and water, and labeled what it is.

In the cells of the section just made were seen chlorophyll and protoplasm, but there is a third and very important substance present in the cells of many plants, this being starch. To observe the granules *in situ* make a thin section of a piece of raw potato, place it on a slide with a drop or two of water, cover with a circle as already described, and apply a $\frac{1}{4}$ inch power. The granules of starch will be seen lying in the cells, and showing that the potato is principally composed of this substance.

When starch granules are viewed by polarized light, on rotating the analyzer of the polariscope they show a beautiful black cross; this is one of the best tests for this substance in adulterated powders.

To view the cells and stomata of the epidermis place a portion of laurel or ivy leaf in strong nitric acid to which a little water has been added; boil this in a beaker over a Bunsen or on a sand-bath, and, after boiling for several minutes, the epidermis will separate as a thin skin from the remaining portion of the leaf; the contents of the beaker should then be thrown into a plate full of water, and the epidermis removed to another vessel, where it should be well washed; when thoroughly freed from the acid, cut off a small piece and place it on a slide in the usual manner, and view first with a 1-inch and then with $\frac{1}{4}$-inch power; this will give a capital view of the epidermal cells and stomata, the latter being made up of two semi-lunar cells placed together.

Spiral vessels will be found in common garden rhubarb; a good way to obtain these is to peel off a few strips from the stalk of the plant, let them macerate in water for a few days, then with the finger and thumb separate the soft portions from what seem like stout threads; take one of these, place it in a watch glass or small porcelain dish with a little water in it, and, with a needle in each hand, gently tease out this thread. This will

require a little patience, without a good supply of which no one can be a successful microscopist. After teasing it out as much as possible, select the thinnest strands and place them on a slide; examine with a pocket magnifier, and if you have separated a spiral vessel transfer it, by means of a bent needle, to another slide; place a drop of water on it and cover with a glass circle, then examine with a 1-inch power, which will show the spirals well. They are rather delicate objects, and if much meddled with will easily break. Double spirals can be seen in thin shavings of the yew-tree, but require a very high power to show well. They give great strength and elasticity to the wood; hence its use in olden times in the manufacture of bows.

Disc-bearing cells will be found in any coniferous wood—common deal or the ordinary cedar-wood of pencils. Very thin sections with the razor will show the cells without any previous treatment; a very thin shaving with a carpenter's plane is even better than one made by the razor, as the plane makes the section of a uniform thickness, which is apt not to be the case when the razor is used.

Scalariform vessels are easily found in ferns, a longitudinal section from a tree-fern giving a good specimen. By making an oblique section near the base of the stalk of the common hart's-tongue fern one will find a very good example of this kind of tissue.

Plant hairs are so common that a notice of one or two of them will be sufficient. A favorite slide among microscopists is one showing the stellate hairs of the deutzia. They are found on the surface of the leaf, and are usually shown as an opaque object under condensed light; by this is meant the shutting off of the rays of light from the reflecting mirror with the diaphragm, and throwing on the object a beam of light obtained from the side condensing lens. The column of the monadelphous stamens of the common mallow have beautiful hairs, which under polarized light are lovely objects. They are obtained by cutting away the staminal portion of the flower, and placing it longitudinally in a slit made in a small phial cork; with the razor make a very thin slice, which will most probably adhere to the blade; this must be washed off into a small saucer, and then transferred to a glass slip for examination in the usual way; if a satisfactory specimen has been obtained, it ought to be placed in a little spirit and water in a very small phial until it is required for mounting. Nux vomica seeds are covered with very fine hairs, which give them that silky appearance and feeling between the fingers; they likewise make good objects for mounting, as they show well when viewed by polarized light.

In order to observe that very interesting sight, the gyration of the cell contents, several water plants, such as chara, nitella, and anacharis, may be chosen to advantage. Anacharis is easily obtained from any canal or river; it is commonly known as water thyme, or the new river weed, and is an exceedingly quick grower, as is shown by the fact that though only introduced about fifty years ago, yet it has overrun Great Britain and choked rivers and canals until it has become a positive nuisance. If a leaf of this plant be laid on a slide, a drop of water placed on it and covered with a circle, it will show under a $\frac{1}{4}$-inch power the circulation of the

cell. Sometimes it is slow to commence, as the shock to the leaf, caused by its separation from the stem, seems to suspend the cell movement. By gently warming it over a lamp, and waiting for a few minutes, the circulation will soon be seen. Viewed by the microscope, the movement is from left to right, but as objects are reversed when seen through the instrument the movement is of course the opposite way.

Before proceeding to describe the different methods of mounting, it is necessary to call the attention of the worker to one essential, and that is, cleanliness. Every slide and cover previous to mounting must be thoroughly washed, and finally wiped dry with a piece of chamois skin or cambric handkerchief; no cloth ought to be used that gives off fluff. Moreover, when working with the instrument, care should be taken that it is done in a room where there is little dust, as this latter interferes sadly with one's operations.

Objects are mounted in various ways, as transparent objects or opaque. The transparent can be mounted in two ways, either dry or in fluid. I will begin with the transparent method, and give a list of the articles required: Canada balsam, dammar solution, glycerin jelly, gold size, spirits of wine, oil of cloves, turpentine, and camphor water. Dammar solution is made by dissolving equal parts of gum dammar and mastic in benzol; a recipe for glycerin jelly will be found in the "Pharm. Journal," Third Series, vol. v. Mr. Pocklington reccommends chloride of barium as a preservative, but I find carbolic acid better. Unless the student is working largely, it is better for him to purchase small bottles of these preparations, as it does not pay to make them in very small quantities. Canada balsam and dammar are the two media most used for dry objects; they answer very well for hard woods or dense tissues, as the transparency of a section is much increased, more especially by the dammar.

To mount objects with the above, make a transverse section of some root, say, sarsaparilla, using a cork for embedding the root. Having procured a section sufficiently thin, soak it in turpentine for a day, then transfer to the centre of a glass slide, which must be perfectly clean, gently warm the slide, and with a glass rod drop a small quantity of balsam or dammar over the object, taking great care not to have any air-bubbles. Having previously cleaned the glass circle by breathing on it and gently rubbing between the thumb and forefinger with a cambric handkerchief, warm it, and let it down gently on the balsam, as previously described for temporary mountings. By this method a slight wave is given to the balsam, which helps to drive out the air-bubbles. The slide should then be put aside in a warm place for a week or two, until it is thoroughly hardened, after which it should be cleaned from the superfluous medium with a penknife, and, finally, with a small rag soaked in turpentine. It may then be covered with ornamental paper, having a hole punched through the centre, or else finished with a ring of gold size run round the circle to preserve it; this ring is easily put on with a Shadbolt's turntable, which is a circular plate (usually made of metal) spinning round on a pivot, the slide being fixed with clips to the table, and, while rotating, a camel-hair pencil charged with the cement is held at one side of the circle, and in the

spinning it takes on a neat circle of cement. Should air-bubbles be present in the medium, they can easily be removed before mounting by heating a needle-point and touching the bubbles; if they are detected after mounting they may disappear in the drying, but it is best to thoroughly examine the balsam before covering, and thus prevent the vexation caused by their presence.

In the above description it is recommended to make a section from the dry wood. In some cases such a section will be found, after soaking in the turpentine, to be slightly curled; it ought then to be put between two glass slips held together by a clip until quite flat, or else before making the section let it soak in water for a day or longer, according to the thickness of the wood, and then slice it; but in order to mount it in balsam it must be steeped in spirit, then in oil of cloves, then in turpentine, and lastly mounted in the balsam.

In mounting an object in fluid you have to take into consideration the nature of the substance and the suitability of the medium. The fluids used are camphor water, glycerin, and various solutions. Glycerin is not recommended for many vegetable substances, as it is liable to rupture the cell wall. I have found camphor water a very good preservative, having mounted starch granules in it about six years ago, and at the present time find them as good as when first mounted. To mount an object by this method, procure either a slide with a sunk cell, that is, the glass hollowed out in the centre (these can be had from any optician), or else make a cell with a ring of gold size, not so wide as a glass circle, on a plain slide. This is usually done by the turntable as mentioned above. After the cement is dry, the cell should be filled to overflowing with camphor water, and the object, such as a piece of cuticle, immersed in it; the cover is then to be carefully let down, taking the precaution to see that no air-bubbles have been imprisoned. The next stage is to remove the superfluous water from the sides of the cell; this is done with a little blotting-paper, taking care not to bring it too near the edge of the cell, otherwise it will draw out some of the liquid, thus causing air to enter, and necessitating remounting. Having now removed the superfluous moisture without disturbing the cover take a camel-hair brush dipped in gold size or other cement, and paint round but not on the circle. When dry, paint afresh, gradually getting nearer the cover, but always remembering to allow each coating of cement to dry; finally include the edge of the cover about the eighth of an inch, or a little less; and, in order to give neatness to the slide, a ring of some cement should be put on with the turntable.

Mounting in glycerin jelly is much easier than the above, more like mounting in balsam, and, as it answers for many objects, and is easily worked, it is in great favor among microscopists. Make a thin longitudinal section of some soft stem, such as chickweed, wash it well, drain, transfer to a slide gently warmed, take a glass rod, dip it into melted glycerin jelly, and allow a drop or two to fall over the object until you think there is sufficient, of course looking out as before for air-bubbles; warm the glass cover and let down gently; put aside for half an hour, and it will then be ready to receive a ring of cement or paper cover.

When it is desired to mount sections of substances containing water, in balsam or dammar, the plan usually followed is to soak first in spirit, then in oil of cloves, then in turpentine, and finally in the balsam.

Some objects are mounted without any medium; they are simply fastened to the slide either with or without gum, and covered in the ordinary way. Among such may be mentioned thin shavings of deal, mahogany, elm, etc., which, of course, ought to be taken from dry, seasoned wood.

Opaque objects require the side condensing lens for their illumination. Glass slips are unnecessary, slips of wood being usually employed. Procure a piece of wood, make it of the same width and length as a glass slip, but hardly so thick; then get a piece of cardboard of moderate thickness, cut it to the same width as the slip, and about half the length; punch a hole right through, not so large as the diameter of a glass cover; gum it to the wood slip and allow it to dry. After the gum is quite dry, put into the cell now made a few drops of Brunswick black or strong mucilage; set aside to harden in a place free from dust, and when ready, place the object upon it; then cover with a glass circle, touched at the edges with gold size, and finish by covering with ornamental paper. If mounted on the Brunswick black it will fasten itself, as this cement gives with the weight of the object (provided it has not been dried too much); if mounted on the gum it will be necessary to breathe upon it for a few seconds, and then place the object on it. Of the two substances here mentioned Brunswick black is the best, as it shows a good dark background to the object. Pollens, seeds, and hairs are often mounted in this way, more especially the two former. The pollen of the mallow is a great favorite from its pretty appearance. Seeds, if large, are best fastened with a little gum to the glass, on the underside of which a piece of dead-black paper should be pasted. If hairs are shown under condensed light, it is better to let them remain on the leaf, unless a good dark background can be given.

Where the worker is at a loss to know the proper medium in which to mount his object, his best plan is to try all the methods. By this means he finds out which is best suited for the object, as well as the knowledge it gives him for future cases of a similar nature.

Before closing, I would again caution the student in microscopy to be very scrupulous in the matter of cleanliness, both with his instrument and his tools, and not to use anything but a piece of soft and well-beaten chamois skin to clean the lenses when dimmed or soiled.—*Chemist and Druggist*, Feb. 15, 1882.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, April 18, 1882.

Mr. Robbins, in the absence of the President, was called to the chair.

The minutes of the last pharmaceutical meeting were read, and there being no corrections suggested, they were approved.

Professor Maisch read a paper upon *Chia seed*, by Mr. Hiland Flowers, a graduate of this College, and followed the reading of it with another, the

results of his own studies upon the literature of the subject; these papers were both listened to with a great deal of interest and were referred, upon motion, to the Publication Committee (see pages 227 and 229).

Dr. Wolff was asked whether he had made any further investigations upon the chlorinated oils, which had been the subject of discussion at the last pharmaceutical meeting. In reply he stated that he had continued his experiments and they tended to show the correctness of Prof. Sadtler's views about the formation of substitution compounds, the displaced hydrogen combining with a portion of the chlorine to hydrochloric acid, and another portion of the chlorine taking the place of the hydrogen thus removed; when the investigation in progress shall have been completed he hoped to present a paper upon the subject at an early meeting.

Dr. A. W. Miller asked permission to read a paper from the "Chicago Pharmacist," of January last, upon the trade in *proprietary articles.* As the College does not recognize in any manner such articles the Chair decided it could only be done by a vote of the meeting, which was taken and permission granted, it being understood that the subject could not appear in the reports of the meeting. After the reading there was some discussion relative thereto, and the whole subject was recommended to be referred to the next meeting of the Trade Association of Philadelphia Druggists, an association specially organized to take cognizance of all matters of *trade* interests.

Mr. A. P. Brown exhibited a few *micro-photographs* which elicited expressions of admiration from those who examined them at the success obtained in illustrating minute objects in this way.

There being no further business, the meeting adjourned.

T. S. Wiegand, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The Massachusetts College of Pharmacy held its fourteenth annual commencement in ,the College Hall on the evening of April 5th, when the President, M. Solomon Carter, conferred the degree of Graduate in Pharmacy upon the following candidates: Nathaniel Herbert Clark (Gamboge), Richard Barker Dawson (Seidlitz Powders), Henry Eugene Fleming (Adulteration of Rhubarb), Franklin Willard Freeman (Lime Water), Lyman Whitney Griffin (Tinct. Opii), Daniel Hirth (Syr. Senegæ), Edgar Clarence Maxey (Tinct. Rhubarb), Edward Franklin Otis (Myrrh), Edward Ellis Ray (Citrate Iron and Quinine), George Melzar Stetson (Iron), Jas. Henry Thompson (Liq. Potassæ), and Henry Thacher (Syr. Iodide of Iron). The degree was granted "with honors" to J. H. Thompson for having passed a satisfactory examination in the elective department of practical and analytical chemistry. Prizes were granted as follows: For recitations in junior class to W. R. Whittier (National Dispensatory), and in senior class to H. N. Hooper (Royle's Materia Medica and Woehler's Chemistry); for written examinations in junior class to

F. E. Mayberry (National Dispensatory), in senior class to R. B. Dawson (Attfield's Chemistry and Thomas' Medical Dictionary). The valedictory addresses were delivered on behalf of the class by J. H. Thompson, and on behalf of the faculty by Prof. G. F. H. Markoe.

The National College of Pharmacy at Washington, D.C., held its annual meeting on April 3d, when the reports of the various officers and committees were read. The reports show that during the past year a considerable sum was expended for increasing the means of instruction. Owing to the want of a separate room for instruction in analytical chemistry this branch had to be postponed until the close of the lectures, but arrangements are being made for giving hereafter this instruction during the regular course. The commencement will be held about June 1st.

The following officers were elected for the ensuing year: President, W. G. Duckett; Vice Presidents—Charles Becker, Carl Kullberg; Secretary, J. R. Walton; Treasurer, J. A. Milburn; Trustees—W. S. Thompson, G. G. C. Simms, R. B. Ferguson, J. D. O'Donnell, A. M. Read, B. K. Helpenstine and C. H. Mourse.

Pittsburg College of Pharmacy.—At the meeting held April 11th, the election of officers and of trustees resulted as follows: President, Geo. A. Kelly; Vice Presidents—Joseph Abel, Francis H. Phillips; Secretary, Albert H. Wilson; Treasurer, Jos. Kimmel; Corresponding Secretary, Jas. B. Cherry; Curator, Wm. G. Schirmer; Trustees—N. McClarran, F. H. Eggers, H. Schmidt, A. S. Bender, L. Emanuel, Jas. Kerr, Jr., Peter Weber, S. H. Stevens, A. C. Robertson, S. S. Holland, M. J. McGann. Among the committees appointed was one on legislation, to act in conjunction with a similar committee appointed by the State Pharmaceutical Society to further the enactment of a general law regulating the practice of pharmacy in the State.

Cincinnati College of Pharmacy.—The tenth annual commencement was held on the evening of March 15th, at the College Building, before a large audience. The opening address was delivered by the President, Joseph H. Feemster, and addresses on behalf of the Board of Trustees by Rev. Thomas H. Vickers, Rector of McMickan University, and on behalf of the Faculty by Prof. E. S. Wayne. The degree of Graduate in Pharmacy was conferred by the President upon the following:

Robt. Bingman,	Jas. Hausman,	J. W. Reakirt,
L. E. Burgess,	Charles Keller,	Chas. Smedley,
Alb. Dann,	J. C. Krieger, Jr.,	P. M. Streich,
Con. Ebert,	Ch. Langenbeck,	W. D. Waggoner,
C. C. P. Fennel,	E. H. Latham,	B. F. Weeks,
Jul. Fredrichs,	Ferd. Ott,	Nathan Wolf.

The Alumni gold medal for the best general average in the examination was awarded to Chas. C. P. Fennel, who received also the prize for the best examination in chemistry, Chas. Smedley the prize in pharmacy, and Charles Langenbeck the prize in materia medica and botany. The

graduating class presented the College with a fine oil painting of Prof. A. Fennel.

In the Junior examination 23 students passed out of a class of 38.

THE ALUMNI ASSOCIATION OF THE NEW YORK COLLEGE OF PHARMACY, on April 18, elected L. M. Royce Treasurer, in place of S. H. Ambler, resigned, and considered amendments to the by-laws relating to the Treasurer's duties.

LANCASTER COUNTY, PA., PHARMACEUTICAL ASSOCIATION.—The election of permanent officers, held April 13, resulted as follows; President, Chas. A. Heinitsh, Lancaster. Vice President, Wm. F. Maulick, Columbia. Secretary, A. A. Hubley, Lancaster. Treasurer, H. B. Cochran, Lancaster. Executive Committee—Dr. B. F. W. Urban, Lancaster; Wm. F. Maulick, Columbia; A. G. Frey, Lancaster.

A discussion of several matters of interest to the profession followed, and a number of questions were proposed for discussion at next meeting.

The second Thursday of each month was selected as the time for holding stated meetings of the association.

EDITORIAL DEPARTMENT.

ADDITIONAL NOTE ON CHIA.—In "La Naturaleza," for 1881, a Mexican journal, received after the papers on Chia (pp. 227 to 234) had been printed, we noticed a paper entitled "Calendario Botánica del Valle de Mexico. Noticia de algunas plantas que caracterizaron la floracion en el año de 1879 por el Sr. Mariano Bárcena." In this paper it is stated that *Chia azul* is probably a variety of *Salvia patens*, Cav., and flowers during the months of June, July and August, while the more common *Chia* is *Salvia polystachya*, Ort., and is in bloom from June to October. The latter species is stated by Kunth to be shrubby, but DeCandolle describes it as herbaceous, with an erect, smoothish or somewhat pubescent stem, and with leaves which are 2 to 3 inches long, petiolate, ovate, acuminate, serrate, rounded or cordate at the base, on the upper side roughish-pubescent and on the lower side nerved, tomentose or pubescent, etc.

It will be observed that the description of Guibourt's plant agrees better with the above, with which it is most likely identical, than with either S. hispanica or S. Columbariæ.

The leaves of Salvia patens are crenate, ovate-deltoid, hastate at the base or the upper ones rounded.

THE LIQUOR DEALERS' LICENSE.—As most pharmacists object to being classed as liquor dealers, and as the internal revenue laws on this subject are about to undergo a change, the following resolution has been prepared by a committee of the Pennsylvania Pharmaceutical Association for insertion into the proposed new law; by this resolution the stigma and odium attached to the profession of pharmacy, under the present classification, is

entirely removed, and it is hereby earnestly requested that every pharmacist will send a copy of the resolution to his Representative at Washington and request him to advocate its passage.

That this resolution will be unsatisfactory to some, from the fact that it does not urge the removal of the tax, is fully understood by the committee, but in view of the undeniable fact that many in our profession do sell spirituous liquors for other than medicinal purposes, they could not with any hope of success, ask for its absolute removal.

WHEREAS, Apothecaries or pharmacists, in the regular prosecution of their business, are compelled to sell in combination or in their pure form the various spirituous liquors, for the sale of which by this act a retail liquor dealer's license is required, *It is hereby provided* that any apothecary or pharmacist, who upon oath or affirmation declares that he does not propose or intend to sell such spirituous liquors as a beverage but only for medicinal purposes, shall upon the annual payment of a sum equal to the sum required for the retail liquor dealer's license, be exempt from taking out such license, and shall receive from the Collector of Internal Revenue a receipt setting forth this exemption. Said receipt need not be publicly exposed at his place of business, but must be shown to any internal revenue officer upon demand.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Year-Book of Pharmacy, comprising Abstracts of Papers relating to Pharmacy, Materia Medica and Chemistry contributed to British and Foreign Journals from July 1, 1880, to June 30, 1881, with the Transactions of the British Pharmaceutical Conference at the Eighteenth Annual Meeting, held at York, August, 1881. London: J. & A. Churchill. 8vo, pp. 560.

This valuable annual is in appearance and arrangement similar to the previous volumes. The first 290 pages are occupied by the "Year-Book"; then follows, upon 26 pages, a list of titles of pharmaceutical and allied books which have been published during the year; next the roll of members, and the minutes of and papers read at the last Conference meeting, of which a synopsis will be found on page 529 of our last volume.

Proceedings of the American Pharmaceutical Association at its Twenty-ninth Annual Meeting, held in Kansas City, Mo., August, 1881; also, the Constitution and Roll of Members. Philadelphia: Sherman & Co., Printers. 8vo, pp. 612.

As we go to press we learn that this volume will soon be distributed to all entitled to receive it. The report on the Progress of Pharmacy occupies 350 pages, the committee reports 34 pages, the papers read 74 pages and the minutes 50 pages. The price for the volume bound in cloth, by mail, will be $6; full sets of bound volumes, $68. In order to induce members to complete their sets, all the volumes, bound, up to 1872, inclusive, are offered for $20, and up to 1875, inclusive, for $30. Orders for Proceedings should be addressed to Prof. J. M. Maisch. It should be stated yet that the new volume will be embellished by a handsome portrait of the late Chas. W. Badger.

Proceedings of the California Pharmaceutical Society and College of Pharmacy; Report of the Thirteenth Annual Meeting, held at San Francisco, January 12, 1882. 8vo, pp. 117.

Abstracts of most of the papers of this pamphlet were published in our last number, pp. 175 to 180.

Proceedings of the Third Annual Meeting of the Missouri State Pharmaceutical Association, Kansas City, October 25, 1881. Pp. 22.

A brief account of the meeting was published on page 634 of our last volume.

Proceedings of the Alabama Pharmaceutical Association, First Annual Session, held at Birmingham, Tuesday, August 9, 1881.

The next meeting will be held at Mobile, May 9. The President of the Association is P. C. Candidus, of Mobile; Recording Secretary, S. W. Gillespie, of Birmingham; Local Secretary, Chas. A. Mohr, of Mobile.

Proceedings of the New Hampshire Pharmaceutical Association at the Eighth Annual Meeting, held in the city of Concord, October 11, 1881. Pp. 48.

For an account of the meeting see page 586 of our November number, 1881. The next meeting will again be held at Concord.

Twenty-fifth Annual Report of the Council of the Pharmaceutical Society of Victoria, 1882. Melbourne.

In addition to a condensed statement of the work done during the year, the pamphlet contains also a list of the members and honorary members of the Society.

The Pharmaceutical Register of Victoria for 1881. Melbourne.

The pharmacy act was passed in 1876. There are about 700 pharmaceutical chemists on the register at the present time.

An Ephemeris of Materia Medica, Pharmacy, Therapeutics and Collateral Information. By Edward R. Squibb, M.D.; Edward H. Squibb, S.B., M.D., and Charles F. Squibb, A.B. Brooklyn, N. Y.

This is a periodical intended to be issued from time to time with the object of noting down the results of a long experience and observation, and the deductions therefrom, together with occasional original work. American medicine and pharmacy, as well as science in general, may be congratulated that Dr. Squibb, aided now by his two sons, will publish such results as indicated. Thus far two numbers of the "Ephemeris" have been published, and the papers contained therein are written in the exhaustive style which characterizes nearly all his contributions to science. Perhaps the most important paper is the one on the morphine strength of opium, in which the author shows the quality of commercial

opium to be better than is often supposed. In 12 lots, comprising 230 cases, and amongst these four lots of opium of poor appearance, the minimum morphine yield was 9·6 per cent. and a maximum yield = 12·7 per cent. for crude opium. Commercial samples of powdered opium—excluding two, which had probably been reduced in strength by some gummy admixture and assayed 9·5 and 12·5 per cent.—were found to contain between 13·9 and 15·1 or an average of 13·52 per cent. of pure morphine; the strength of good powdered opium of this market is therefore 14 per cent., with a variation of about 1 per cent. between the extremes of morphine strength. These are important facts against the official recognition of opium of 10 per cent., which would necessitate the addition of admixtures that could only be regarded in the light of adulterations. The process adopted by Dr. Squibb for assaying opium is a modification of that proposed by Flückiger; the accurate results obtained by it depend in a great measure upon details, given in full in his paper, which we publish in this number. (See page 244.)

The other important papers relate to the adulteration bill before Congress, to clinical thermometers, to the elixir nuisance, and to the new code of ethics of the Medical Society of the State of New York. Other shorter articles on Chian turpentine, winter eczema, various salicylates, are likewise deserving attention.

Handwörterbuch der Pharmakognosie des Pflanzenreichs. Herausgegeben von Prof. Dr. G. C. Wittstein. Breslau: Eduard Trewendt, 1882.

Dictionary of Pharmacognosy of the Vegetable Kingdom.

We have before us Part 1 of this work, a handsome pamphlet of 144 large octavo pages, which is being published as a part of the "Encyclopedia of the Natural Sciences," comprising botany, zoology, pharmacognosy, mineralogy, mathematics, chemistry, physics and astronomy, and in course of publication since 1879.

As indicated by the title, the work before us is a dictionary, and its arrangement is therefore alphabetical. The most popular German names have been chosen for the heading, and where there is no common name in that language the commercial designation has been selected. This is followed by the different synonyms in the vernacular, then by the officinal Latin names as used in Germany, by the systematic names of the plants and the classes and orders of the Linnean as well as of the natural system. A brief characteristic of the plant is next given, including its habitat, and followed by a full description of the medicinal part, the principal chemical constituents, a description of substitutions or adulterations, medical uses, historical and etymological notes. As a specimen of the manner in which the subject has been treated by the author, we translate the article on a plant quite common in some parts of North America, and known here as *winter cress* and *yellow rocket.*

Barbarakraut.

(Winterkresse, Winterbrunnenkresse), *Herba Barbareæ.*
Barbarea vulgaris, R. Br. (*B. arcuata,* Sturm; *B. iberica*, D. C., *Erysimum Barbarea*, Lin.)
Tetradynamia Silquosa.—Cruciferæ.

A perennial plant, with a fusiform-cylindrical white fibrous root, a 30 to 60 centimeters high, erect, above branching, smooth, angular-furrowed stem, and with alternate wand-like branches. The leaves are clasping, large, lyrate, crenate, auricled at the base, the terminal lobes roundish, the others obovate, smooth, somewhat glossy green, rigid. The small yellow flowers form terminal, dense, ovate racemes, which in fruit are considerably elongated. The younger pods are obliquely erect, 24 to 36 millimeters long, somewhat compressed, obtuse, four-angled, and contain oval-roundish, flat, yellowish-brown seeds. Frequent on the banks of rivers, on ditches and wet meadows.

Part Used.—The herb; its taste and odor are cress-like, but somewhat milder, the taste also bitter.

Principal Constituents.—Acrid volatile oil, bitter principle. Not analyzed.

Uses.—Fresh, like water cress and scurvy grass (cochlearia). The tender young leaves are eaten in winter (when they usually remain green) and spring as salad, or like spinach as pot herb.

Historical.—The plant seems to have first attracted attention in the middle ages. Camerarius (†1598) calls it *Bunium adulterinum*, and states it to be also known as *Carpentaria*, *Herba sancta*, *Fistularia* and *Nasturtium hyemale;* it was at an early date cultivated in German gardens, and particularly valued as a remedy for the cure of fistulas and sores.

The name Barbarea was probably chosen in honor of St. Barbara (from Nicomedia, in Asia Minor, about 300 after Christ). *Erysimum* from ἐρύειν (to help, to save) in relation to its remedial properties.

In a similar manner the other drugs are described, those of greater importance being treated of more in detail, for instance, buchu, ipecacuanha, hyoscyamus, benzoin, valerian, asafœtida and others. The excellent and extensive article on cinchona barks is from the pen of Prof. Dr. Garcke.

It will be observed from the foregoing that the work, when completed, promises to be a most useful one for reference and information, equal to those by the same author which in the past have been deservedly regarded as standard works.

In regard to the scope of the work, it should be stated that it is confined altogether to drugs of vegetable origin, and among these not only those which are generally used in Europe at the present day have been selected, but likewise a large number of such which, though more or less antiquated or fallen into disuse, seem to deserve notice on account of their properties or constituents.

The typography being clear and attractive, and the paper good, the volume will be a handsome one, and thus, both on account of its internal value and convenience for consulting, as well as for its pretty appearance, will be an ornament of the pharmaceutical or medical library.

Album Micrographic d'Histologie générale comprenant l'étude comparée des tissus végétaux et animaux sous le rapport des textures cellulaires. Par L. Créteur. Bruxelles.

Micrographic Album of General Histology, embracing a Comparative Study of Vegetable and Animal Tissues.

This album contains about seventy lithographic plates, large quarto size, of microscopic drawings made by the accomplished author, and magnify-

ing the illustrated objects 500 or 1,000 diameters in most cases. The illustrations comprise starches, blood, urinary products, diatoms, animal tissues, parasites and a limited number of vegetable drugs. They are well executed, and give a clear and faithful view of the characters of the articles selected for examination.

The Practice of Commercial Organic Analysis. A Treatise on the Properties, Proximate Analytical Examination and Modes of Assaying the Various Organic Chemicals and Products employed in the Arts, Manufactures, Medicine, etc., with Concise Methods for the Detection and Determination of their Impurities, Adulterations and Products of Decomposition. By Alfred H. Allen, F.I.C., F.C.S., Lecturer on Chemistry at the School of Medicine and the Wesley College, Sheffield, etc. Vol II. Philadelphia: Presley Blakiston, 1882. 8vo, pp. 561. Price, $5.00.

The contents of the present volume evidently embrace the results of practical experience, and of careful scrutiny of the extensive literature on the subject of commercial analysis. The branches treated of comprise hydrocarbons, fixed oils and fats, sugars, starch and its isomers, alkaloids and organic bases.

The first section embraces the paraffins, terpenes, benzene and homologues, naphthalene and anthracene. For the soft paraffin or petroleum jelly the designation *vaselene* is suggested; with the synonyms cosmolene and saxolene, a change in spelling which renders the termination in accord with that scientifically adopted for analogous compounds. The essential oils, camphors and resins are briefly considered among the terpenes, embracing mainly oil of turpentine, turpentines and derivatives. Bees' wax, spermaceti and soap are very naturally considered among the fats, where we miss, however, allusion to cacao butter, which in American pharmacy is of not insignificant importance. In the chapter on starches, Prof. Prescott's lucid scheme of the proximate analysis of plants has been interpolated, which we think would have found a more appropriate place in an appendix. The last chapter is mostly devoted to the medicinal alkaloids; but aniline and its homologues and basic derivatives are likewise considered, without, however, entering minutely into the dyes and coloring matters, these being purposely omitted, as were also the animal products, like milk, urine, blood, albumen, etc. A distinction is made between some of the alkaloids, and there is evidently a typographical error in section B, where it should read "the pupil is *contracted*." The alkaloids mentioned there are morphine, physostigmine, strychnine and aconitine, the last one of which, we believe, produces only a transient contraction.

It will be observed that the scope of the work is of especial application to the wants of the pharmacist, who, like the professional analyst, will find it a very useful work, calculated to give the best practical means for determining the purity and identity of the compounds and products enumerated. The style is clear and free from superfluities, and very rarely needs further qualification, as, for instance, on page 55, where it is stated that "most of the *oxygenated* and sulphuretted essential oils have been

obtained by synthetical means." Only few typographical errors have been observed by us, one of these being the name of Soxhlet, which, on pp. 127 and 504, is spelled "Xoxheth."

Premiers Résultats des études sur la formation des Matières colorantes par voie électro-chimique. Exposés par Frédéric Goppelsroeder. 4to, pp. 24.

First Results of the Studies on the Formation of Coloring Matters by the Electro-chemical way.

A pamphlet printed in explanation of a large number of aniline-derivatives and other coloring matters obtained in the manner indicated and exhibited at the electrical exposition of Paris. As early as 1875 the author indicated his line of investigations, and some of the results obtained, in a communication to the Industrial Society of Mulhouse. The pamphlet contains four plates illustrative of the apparatus employed in these researches.

The Students' Guide in Quantitative Analysis; intended as an Aid to the Study of Fresenius' System. By H. Carrington Bolton, Ph.D., Professor of Chemistry in Trinity College, Hartford, Conn. Illustrated. New York: John Wiley & Sons, 1882. 8vo, pp. 127. Price, $1.50.

Quantitative chemical analysis can be undertaken only by one who has well mastered the various methods for the qualitative recognition and separation of the various elements and compounds, and in thus working has accustomed himself to accuracy. In commencing the determination of quantities articles are selected, beginning with the simpler compounds and proceeding gradually to the more complex and difficult ones. The book before us contains such a judicious selection of examples for quantitative analysis, and gives brief but ample directions for accomplishing the task, at the same time indicating the points requiring special study. It is well adapted for practical laboratory work, and while primarily intended for the beginner, also the more advanced student will find it a valuable "guide." The typography, illustrations, paper and binding are alike commendable.

Les Pyrénées-orientales et leur hydrologie. Par J. Léon Soubeiran.

The Eastern Pyrenees and their Hydrology.

A reprint from the Transactions of the Geographical Society of Languedoc, and accompanied by a geological map of the district described.

Illustrations of Dissections in a Series of Original Colored Plates. By Geo. Viner Ellis, Professor of Anatomy in University College, London, and G. H. Ford, Esq. Vol. II. Second edition. New York: Wm. Wood & Co., 1882. 8vo, pp. 226.

We have noticed the first volume of this valuable work in our February number, page 96, to which we refer for favorable comments, which apply alike to the book before us. This contains thirty plates, with the accompanying descriptive text, illustrating dissections of the perinæum, the abdominal parietes, the pelvis and the lower limb.

Lectures on Diseases of Children. A Handbook for Physicians and Students. By Dr. Edward Henoch. New York: Wm. Wood & Co. 8vo, pp. 357.

As dispensary physician, and subsequently as director of the clinic and polyclinic for diseases of children in the Royal Charité, and professor in the University of Berlin, the author has had an extensive experience in this field, covering a period of thirty-seven years, and, considering the many thousands of cases that have thus come under his immediate observation, has had ample material for writing a practical work, based almost exclusively upon personal experience. The subject matter is divided into ten parts, embracing diseases of the new-born, of infancy, of the nervous system, of the respiratory organs, of the circulatory organs, of the digestive organs, of the uropoëtic organs, infectious diseases, constitutional diseases and diseases of the skin. In an appendix a limited number of formulas are added, merely for the purpose of furnishing hints to younger physicians in beginning children's practice.

The volume forms a valuable addition to the present series of Wood's Library of Standard Medical Authors.

First Biennial Report of the Commissioners of Pharmacy for the State of Iowa, with abstract of State Pharmacy Register. Printed by order of the General Assembly. 1882. 8vo, pp. 81.

The pamphlet gives a full account of the systematic manner in which the Commissioners carry out the duties devolving upon them under the Pharmacy law.

Histoire et Origine de la Corporation des Chirurgiens et des Apothicaires d'Audenarde, dite des SS. Cosmes et Damien, depuis le XII^e^ jusqu 'au XIX^e^ siècle. Par L. Créteur, pharmacien-chimiste, etc. D'après les Recherches et les Traductions des Archives de la Ville d'Audenarde, par Th. Devacht, pharmacien-chimiste, etc. Bruxelles, 1882. 8vo, pp. 152.

History and Origin of the Corporation of Surgeons and Apothecaries of Audenarde, called Sts. Cosmus and Damianus, from the XIIth to the XIXth Century. By L. Créteur. After the Researches and Translations from the Archives of the Town of Audenarde, by Th. Devacht.

A very interesting and valuable contribution to the history of pharmacy and medicine, containing many documents and biographical notes and fac-similes of quaint ancient pictures, seals, and of an application for examination in pharmacy, with the official endorsements of the document. The pictures are those of a Sister Beguine from the XIVth century, and of Dr. Jacobus Varentius, Rector Magnificus of the University of Louvain, who died in 1577, and is represented holding in his right hand a large volume and in his left an enormous saw.

Die Naturgeschichte des Cajus Plinius Secundus. Leipzig: Gressner & Schramm.

The ninth part of this German translation by Prof. Wittstein of Plinius'

Natural History has appeared, embracing the chapters on cultivated trees, agricultural products, flax and garden plants, remedies from garden plants, and on flowers and wreaths.

Homœopathy; What Is It? A Statement and Review of its Doctrines and Practice. By A. B. Palmer, M.D., LL.D., Professor of Pathology and Practice of Medicine in the College of Medicine and Surgery in the University of Michigan. Second edition. Detroit: Geo. S. Davis, 1881. 8vo, pp. 109.

A candid and dispassionate review of homœopathy will, doubtless, be of interest to the medical practitioner and to every intelligent person. Such a book we have before us. It is free from mere denunciations and ridicule, but pursues its searching inquiries by the guidance of the writings on this dogmatic system by its founder and his followers.

On the Physiological Actions of Drugs on the Secretion of Bile. By William Rutherford, M.D., F.R.SS.L.&E., Professor of the Institutes of Medicine in the University of Edinburgh. 4to, pp. 130.

A very valuable contribution towards a correct perception of the physiological activity, in the direction indicated, of about fifty drugs, used either alone or together with others, the effects of which had been previously determined. The pamphlet is a reprint from the Transactions of the Royal Society of Edinburgh, vol. xxix.

New Index of Drugs. New York: R. Hillier's Son & Co. 4to.

It gives the Latin and English names, the latter as "pharmaceutical" (*i. e.* those adopted by the pharmacopœia or dispensatory) and common names. It resembles the works previously published by Pollock, Hobbs, Nickell and others, but is less comprehensive than these.

Review of the Drug Trade of New York for the Year 1881. Prepared by D. C. Robbins, Esq., for the Twenty-fourth Annual Report of the Chamber of Commerce of the State of New York. 8vo, pp. 12.

The statistical information furnished in this "Review" is of great commercial, economic and hygienic interest. A number of manufactured articles, which are largely employed, are either not at all or only to a very limited extent imported at the present time, such as tartaric acid and cream of tartar, ammonium and sodium sulphates, sodium, lime and lead acetates, potassium iodide, refined borax, refined camphor, chloroform and others. The amount of opium imported has increased during the past fiscal year to 385,060 lbs., and exceeds the average of the last six years by 46 per cent. In addition to this, 22,358 oz. of morphine were imported, or an excess over the six years' average equal to 144 per cent. An insignificant decrease of 750 lbs. of opium for smoking is noticed, or less than one per cent. as compared with the preceding year. The importation of cinchona barks was over 4,000,000 lbs. and, though nearly equal to the average, was considerably less than in the five preceding years, with the exception of 1877, when only 1,750,000 lbs. were imported. 408,851 oz. of quinine were imported, or over 95 per cent. more than the annual average for six years.

The Recent Tariff Correspondence Relative to the Import Duties on Chemicals. Philadelphia: Keasbey & Mattison.

A compilation of communications and editorials from the New York "Evening Post," the New York "Times," the "Pharmacist and Chemist," the "Oil and Drug News" and the "Monthly Review of Medicine and Pharmacy." The papers relate chiefly to the duty on quinine which, in 1879, was removed by Congress, in our opinion, very injudiciously.

Twenty-first Annual Report of the Philadelphia Drug Exchange. 1882. Pp. 37.

Aside from the affairs of the corporation, several subjects of local and national importance to the drug trade are discussed, among the latter chiefly questions relating to internal taxes and to the tariff.

The Case of Guiteau. A Psychological Study. By Geo M. Beard, M.D. New York. Pp. 36.

Reprint from the "Journal of Nervous and Mental Diseases," January, 1882.

The Study of Trance, Muscle-Reading and Allied Nervous Phenomena in Europe and America. With a Letter on the Moral Character of Trance Subjects and a Defence of Dr. Charcot. By Geo. M. Beard, A.M., M.D., etc. New York, 1882. Pp. 40.

A careful analysis of facts relating to the investigation of the phenomena indicated in the title and suitably illustrated.

Anæsthesia and Non-Anæsthesia in the Extraction of Cataract. With some Practical Suggestions regarding the Performance of this Operation, and Comparative Statistics of Two Hundred Cases. By Hasket Derby, M.D., etc. Cambridge: Riverside Press, 1882. Pp. 32.

The contents of this pamphlet are based upon several short articles which have appeared in the "Boston Medical and Surgical Journal" and in the "Transactions of the American Ophthalmological Society."

Anæsthetics, Medico-Legally Considered. By J. G. Johnson, M.D. Brooklyn, N. Y. Pp. 23.

Reprint from the "Bulletin of the Medico-Legal Society of New York," Dec., 1881.

Soluble Compressed Pellets. A New Form of Remedies for Hypodermic Use, and Applicable to Ophthalmic and General Medication. By H. Augustus Wilson, M.D., etc. Philadelphia. Pp. 4.

From "Transactions of the American Medical Association," 1881.

Fourth Annual Report of the Presbyterian Eye and Ear Charity Hospital. Baltimore, Md. 1882.

Forty-ninth Annual Report of the Managers of the Pennsylvania Institution for the Instruction of the Blind. Philadelphia. 1882.

OBITUARY.

Antoine Alexandre Brutus Bussy died at Paris, February 1st, in his eighty-eighth year, having been born at Marseilles, May 10, 1794. He served his apprenticeship in pharmacy in Lyons, and in 1818 went to Paris, at first as Boudet's assistant and afterwards as superintendent of Robiquet's laboratory. In 1821 he became assistant to the chair of chemistry at the Ecole de Pharmacie, and remained connected with this institution in the various capacities of professor, administrator and director until 1873, when he resigned. In 1832 he graduated as doctor in medicine, lectured also for several years on pharmacology, was a member of the Academy of Sciences since 1850, was repeatedly elected president of the Paris Society of Pharmacy and of the Academy of Medicine, and was an honorary member of many learned societios, also of the Philadelphia College of Pharmacy.

The deceased published, conjointly with Boutron-Charlard, a valuable work on the adulteration of drugs, translated into the French language Faraday's chemical manipulations, studied the constituents of a number of drugs, and investigated the mode of preparation and the chemical composition of many elements and compounds; in 1829 he isolated magnesium from its chloride by means of potassium.

Translations of several of his essays and many short notes of his researches have been published in the earlier volumes of this journal.

Sir Robert Christison died, at Edinburgh, January 27th, in his eighty-fifth year, having been born in the same city in July, 1797. In 1819 he graduated as M.D. at the University of Edinburgh, and afterwards continued his studies in London and Paris, receiving in the latter city the instructions of Robiquet and Orfila. Returning to his native city in 1822, he was appointed Professor of Medical Jurisprudence, and seven years afterwards published his celebrated "Treatise on Poisons," the first original work on toxicology written in the English language. In 1832 he succeeded Dr. Duncan in the chair of Materia Medica at the University, and in 1842 published his "Dispensatory," based upon the "New Edinburgh Dispensatory" of his predecessor. He also wrote many memoirs, chiefly on subjects of materia medica and toxicology, a number of which have been republished in the earlier volumes of this journal.

In 1823 Dr. Christison became a Fellow of the Royal College of Physicians of Edinburgh, and from 1838 to 1846 served as its president. From 1857 to 1873 he was a member of the Medical Council representing the medical profession in Scotland. In 1868 he became President of the Edinburgh Royal Society, succeeding Sir David Brewster, was created a baronet in 1871, celebrated his professional "jubilee" in 1872, and resigned his chair in 1877. The deceased heartily sympathized with the efforts made to elevate pharmacy, and for many years was an honorary member of the Pharmaceutical Society of Great Britain, and of kindred societies.

Charles Robert Darwin died April 20th, and was buried at West-

minster Abbey, London, April 26th. He was born at Shrewsbury, February 12, 1809, and was educated at the University of Edinburgh and at Cambridge. From 1831 to 1836 he accompanied, as naturalist, the surveying expedition of the ship *Beagle*, and subsequently published several works on the results of his observations. But the one which was destined to attract universal attention, and to be the forerunner of a large class of scientific literature on the philosophical system which has since been termed "Darwinism," was the one published in 1859 under the title "On the Origin of Species by means of Natural Selection, or the Preservation of Favored Races in the Struggle of Life," and which was followed by others, notably, in 1871, by "The Descent of Man and Selection in Relation to Sex." Progressive organic development, or *evolution*, as it is now termed, is an ancient philosophical idea, which at the beginning of the present century was more clearly formulated by Lamarck, but extended by Darwin, and supported with great ingenuity by the results obtained from long years of patient observation and of experimental inquiries, the details of which results are embodied in his later works.

DANIEL BELL HANBURY died at the residence of his son Thomas, at Mentone, on Feb. 12th last, a few days after having completed the eighty-eighth year of his life. He was born Feb. 8, 1794, and was the son of Capel Hanbury and his wife, Charlotte Bell. He was educated at a private school of the Society of Friends, and at the age of fourteen entered the pharmaceutical business at Plough Court, London, carried on by his uncle William Allen, whose partner he afterwards became. In 1824 he married Rachel Christy, who died in 1876, and by whom he had five sons and one daughter, all of whom survive him except the eldest son, the lamented Daniel Hanbury, who died in 1875.

In 1841, at the invitation of Jacob Bell, he took an active part in the organization of the Pharmaceutical Society of Great Britain, serving as a member of the Council from the first, and as treasurer from 1852 to 1867, when he resigned. In 1868 he retired from business.

An obituary notice of the deceased in the "Chemist and Druggist" for March closes with the following remarks, which are also applicable to several of the older sections of the United States:

"A glance round the noted chemists' businesses which date from the early part of this century shows a very large proportion which were established and conducted by members of the Society of Friends. The fact that men of that class have had a genius for making pharmacy a success carries its lesson on the surface, and it may be thought of sometimes now-a-days. Patience through the days of small things, and the strictest integrity in all circumstances, have been the characteristics which have won for them so enduring a share of public confidence. They have not been men who ground their lives away in the determination to make a business; far from that. A dozen names will suggest themselves of Quaker druggists who have been at least as noted in the philanthropic as in the pharmaceutical world. Our age needs more of their old faith in principle applied to every-day business, which alone has insured enduring success, or, if not, can at least make failure honorable."

THE AMERICAN
JOURNAL OF PHARMACY.

JUNE, 1882.

CHLORINATED OIL AND THE CHLORINE SUBSTITUTION IN FAT OILS.

By L. Wolff, M.D.

Read at the Pharmaceutical Meeting, May 16th.

The use of chlorine gas, in the form of chlorine water, in chronic affections of the skin, is by no means of recent origin, and already Thénard and Cluzel recommended the frequent immersion in chlorine water of the hands of those afflicted with itch, by which they claimed to have obtained most excellent and rapid results.

About fifteen years ago I had cause to try it, and had a most excellent success with it; though, to make its effect more lasting and emollient, I experimented with a liniment composed of equal parts of olive oil and chlorine water. The efficacy of this was not less potent, but the absence of any of the chracteristic odor of the gas in this liniment struck me as very peculiar, and I attributed it to a chemical change taking place. As a part of this latter would naturally have to result in the formation of hydrochloric acid, the question arises, if it is the latter or the chlorine gas which had combined with the oil that gave the beneficial results. As the free chlorine in the water, however, had proved effective, the inference is that the chlorine in combination with the oil had given the curative effect.

To test this matter, I was urged by my friend, Dr. J. V. Shoemaker, to make a chlorine compound with oil free from hydrochloric acid, which in the course of therapeutic experiments proved equally effective.

To prepare it I induced a stream of dry chlorine gas, generated in the usual way, into a quantity of oil equal to that of the water in making the chlorine water of the Pharmacopœia, but, to my surprise, found that I was unable to supersaturate the oil, as I had done with the water, no free chlorine becoming at any time evident, until after many days of experiment I ultimately succeeded in my purpose.

The oil so treated showed at first but little change, save that of turbidity, which could not have been due to water being present, as the gas had been well dried. It soon warmed and heated, and vapors of hydrochloric acid were then evolved. It had changed its color but little, grew viscid and of the specific gravity of 1·059. It is insoluble in alcohol, disproving the presence of free oleic acid; when washed with an equal bulk of water, to free from adherent hydrochloric acid, it showed an emulsifiant tendency. Dissolved therefrom with benzin, and the latter evaporated after previously filtering the solution, it left a product such as I here exhibit. Neutral to test paper at first, it grew acid at standing for some time, with well marked turbidity, thus proving the loosely molecular combination of the chlorine, which, being again substituted by hydroxyl, forms more hydrochloric acid. It possesses no marked odor, and certainly not that of chlorine, and varied in taste but little from that of ordinary oils, no irritant action being manifest when applied to the tissues.

An inquiry on this subject at our former meetings led me to investigate this matter more thoroughly, and I arrived at results which, from a chemical point of view, turned out very interesting.

In order to understand the chemistry of this process it is necessary, however, to enter somewhat into the molecular position of the vegetable and animal oils and fats to show exactly where and how a chlorine substitution can take place.

Vegetable and animal oils consist in the main of two principles: one of them, forming on saponification, either with or without great heat or alkalies, is an alcohol named glycerin; the other, forming acids, are termed relatively stearic, palmitic and oleic acids, etc. The radicals of these two constituents are for the former termed propenyl or glyceryl, while for the latter they are known as stearyl, palmityl, and for that which forms the greatest part of the liquid and semiliquid fats, oleyl.

While the propenyl would be expressed as follows:

$$C_3H_5 = \begin{array}{l} \quad\ H \\ \quad\ \vert \\ -C-H \\ \quad\ \vert \\ -C-H \\ \quad\ \vert \\ -C-H \\ \quad\ \vert \\ \quad\ H \end{array}$$

the glycerin or its triatomic alcohol would be constituted thus:

$$C_3H_5{-}3OH = \begin{array}{c} H \\ | \\ H{-}C{-}OH \\ | \\ H{-}C{-}OH \\ | \\ H{-}C{-}OH \\ | \\ H \end{array}$$

The three molecules of hydroxyl in the glycerin are easily substituted by several elements or compounds, such as acetic, benzoic, hydrochloric, hydrobromic and other acids; to illustrate this I give below the molecular position of mono-, di- and tri-chlorhydrins:

$$\left.\begin{array}{c}\text{Chlorhydrin,} \\ C_3H_5{-}2OH{-}Cl\end{array}\right\} = \begin{array}{c} H \\ | \\ H{-}C{-}Cl \\ | \\ H{-}C{-}OH. \\ | \\ H{-}C{-}OH \\ | \\ H \end{array} \qquad \left.\begin{array}{c}\text{Dichlorhydrin,} \\ C_3H_5{-}OH{-}2Cl\end{array}\right\} = \begin{array}{c} H \\ | \\ H{-}C{-}Cl \\ | \\ H{-}C{-}Cl. \\ | \\ H{-}C{-}OH \\ | \\ H \end{array}$$

$$\left.\begin{array}{c}\text{Trichlorhydrin,} \\ C_3H_5{-}Cl_3\end{array}\right\} = \begin{array}{c} H \\ | \\ H{-}C{-}Cl \\ | \\ H{-}C{-}Cl. \\ | \\ H{-}C{-}Cl \\ | \\ H \end{array}$$

In the fats and oils, however, the molecules of hydroxyl of the glycerin are substituted by the radicals of the fatty acids, such as stearyl, palmityl and oleyl, producing ethers, as which fats and oils must be viewed, as for instance:

Stearins or Propenyl tristearyls $= C_3H_5.3(C_{18}H_{35}O_3)$

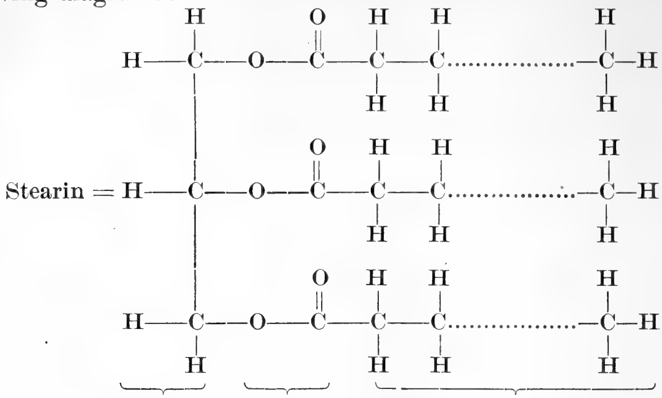
Oleins or Propenyl trioleyls $= C_3H_5.3(C_{18}H_{33}O_2)$

Again, as stearic, palmitic and oleic acids are acids derived from stearyl, palmityl and oleyl, and have an analogous constitution, the former belonging to the series of formic and the latter to that of acrylic acids, their relative constituents must be grouped as follows:

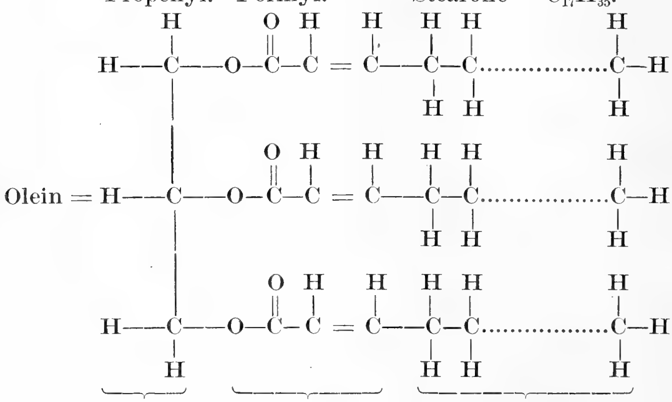
$$\text{Stearic acid} = \underbrace{\begin{array}{c} \\ \\ H{-}O{-} \\ \\ \\ \end{array}\begin{array}{c} O \\ \| \\ C \\ \\ \\ \end{array}}_{\text{Formic radical.}}\underbrace{\begin{array}{c} \\ \\ {-} \\ \\ \\ \end{array}\begin{array}{c} H \\ | \\ C \\ | \\ H \end{array}\begin{array}{c} \\ \\ {-} \\ \\ \\ \end{array}\begin{array}{c} H \\ | \\ C \\ | \\ H \end{array}\begin{array}{c} \\ \\ {-} \\ \\ \\ \end{array}\begin{array}{c} H \\ | \\ C \\ | \\ H \end{array}\begin{array}{c} \\ \\ \ldots\ldots\ldots \\ \\ \\ \end{array}\begin{array}{c} H \\ | \\ C \\ | \\ H \end{array}\begin{array}{c} \\ \\ {-} \\ \\ \\ \end{array}\begin{array}{c} H \\ | \\ C \\ | \\ H \end{array}\begin{array}{c} \\ \\ {-}H \\ \\ \\ \end{array}}_{\text{Stearone.}}$$

$$\text{Oleic acid} = \underbrace{\begin{array}{c} \\ \\ H{-}O{-} \\ \\ \\ \end{array}\begin{array}{c} O \\ \| \\ C \\ \\ \\ \end{array}\begin{array}{c} \\ \\ {-} \\ \\ \\ \end{array}\begin{array}{c} H \\ | \\ C \\ \\ \\ \end{array}\begin{array}{c} \\ \\ = \\ \\ \\ \end{array}\begin{array}{c} H \\ | \\ C \\ \\ \\ \end{array}}_{\text{Acrylic radical.}}\underbrace{\begin{array}{c} \\ \\ {-} \\ \\ \\ \end{array}\begin{array}{c} H \\ | \\ C \\ | \\ H \end{array}\begin{array}{c} \\ \\ {-} \\ \\ \\ \end{array}\begin{array}{c} H \\ | \\ C \\ | \\ H \end{array}\begin{array}{c} \\ \\ \ldots\ldots\ldots \\ \\ \\ \end{array}\begin{array}{c} H \\ | \\ C \\ | \\ H \end{array}\begin{array}{c} \\ \\ {-} \\ \\ \\ \end{array}\begin{array}{c} H \\ | \\ C \\ | \\ H \end{array}\begin{array}{c} \\ \\ {-}H \\ \\ \\ \end{array}}_{\text{Oleone.}}$$

Thus the constitution of fats and oils will be represented by the following diagrams:

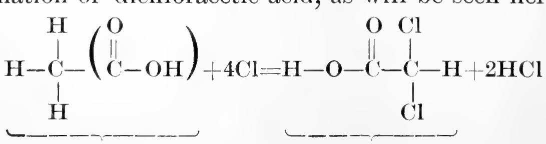


Propenyl. Formyl. Stearone $= C_{17}H_{35}$.



Propenyl. Acrylyl. Oleone $= C_{15}H_{31}$.

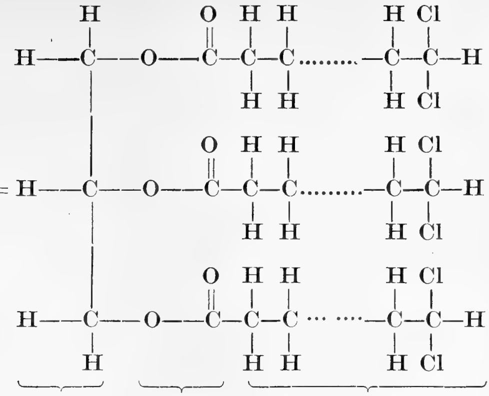
Therefore, if free chlorine gas comes in contact with these molecules, it cannot attack the propenyl, as this is really substituted by the stearyl and oleyl. Again, the stearyl and oleyl cannot be acted on by the chlorine in their acid nuclei, according to the analogy established by the formation of dichloracetic acid, as will be seen herein:



Acetic acid. Dichloracetic acid.

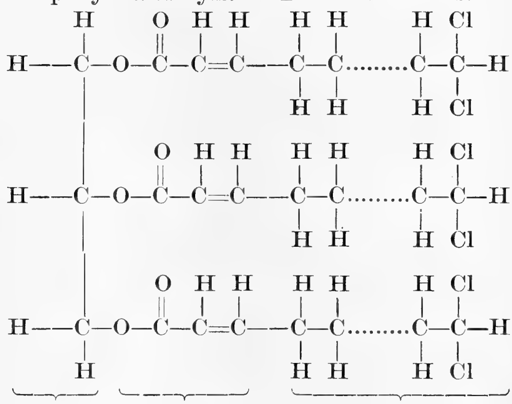
The chlorine must act, therefore, on the hydrocarbon appendices, $C_{17}H_{35}$ and $C_{15}H_{31}$, substituting therein the relative hydrogens by chlorine, resulting in a molecular position as shown below:

Chlorinated stearin =



Propenyl. Formyls. Dichlorstearones.

Chlorinated Olein =



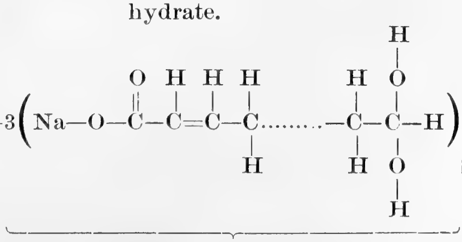
Propenyl. Acrylyls. Dichloroleones.

As palmitin and stearin are much alike in their constitution, a reproduction of the structural formula of the former is unnecessary.

As this chlorinated oil is saponifiable with boiling solutions of the hydrates of alkalies, yielding soap, glycerin and chlorides, I would give below a diagram illustrating its saponification with sodium hydrate:

$$\underbrace{C_3H_53(C_3O_2H_2—C_{15}H_{29}Cl_2)}_{\text{Chlorinated Oil.}}+\underbrace{9(NaOH)}_{\text{Sodium hydrate.}}=$$

$\underbrace{C_3H_8O_3}_{\text{Glycerin.}}$ +3



+$\underbrace{6.NaCl}_{\text{Sodium chloride.}}$

Sodium dioxyoleate.

The soap so produced, of which I here exhibit a specimen, manifests no material difference from ordinary soaps, only that in the course of its preparation it separates as it is formed, owing to the great amount of sodium chloride formed in the process.

The chlorinated oil, by computation of its atomic weight, shows 100 parts by weight to contain about 17·9 parts by weight of chlorine, or, in other words, it would take 48 parts by weight of chlorine gas to convert 100 parts of oil into the chlorinated product of which 24 parts by weight enter into the 100 parts of oil, and 24 parts form hydrochloric acid.

It would appear, hence, that in chlorinated oil we have not alone a very interesting chemical body, but one that is very rich in chlorine as well; and, as the latter exists therein in a loosely molecular condition, it will readily substitute itself again for hydroxyl, forming chlorine compounds with bodies of stronger affinity, and as such will prove probably of great therapeutic value wherever the use of chlorine, both as disinfectant and parasiticide, is indicated, and possibly presenting a proper antagonistic for bacteriæ, which are daily more shown to form the causation of many diseases.

Philadelphia, May, 1882.

ON BAY RUM OR BAY SPIRIT.

By A. H. Riise.

Read at the Pharmaceutical Meeting, May 16.

Bay rum is made by distillation of the leaves and berries of the bayberry tree with rum. Although bay rum is so much used in the United States, very little is known there about its origin, production, and the characters by which it is distinguished from imitations. A brief sketch of it will, therefore, be of interest to the druggist and importer as well as to the public in general.

The bayberry tree (*Pimenta acris*, W. A.; *Myrcia acris*, DC.) belongs to the large family of myrtaceæ, which abound in fragrant volatile oils. The plant is glabrous, of a considerable size, the stem is straight and rigid, the branchlets green and shapely four-angled, the leaves opposite, oval or roundish, shining, coriacious, from 3 to 5 inches long, with numerous parallel nerves, and sprinkled with many pellucid dots. The flowers are arranged in axillary panicles, and are white, with a reddish tinge. The berries are round, of the size of a

pea, two celled, and contain six to eight seeds. The leaves, and particularly the berries, are of a very aromatic odor. The tree flowers from June to August.

There exist many varieties of the bayberry tree throughout the West Indies, scarcely to be distinguished botanically, but with a quite different odor from that which the genuine tree has, and therefore great care must be taken in collecting the leaves which are to be used in the distilling of bay spirit, as the admixture of a small quantity of the other leaves may entirely spoil the product of distillation.

In the manufacture of distilled bay spirit only the true leaves are used, and they are not dried, but thrown fresh into the still, as experience has shown a great difference between the spirits distilled from good fresh and from dried leaves, the odor of the latter being materially altered by the necessary exposure to the sun and air in drying.

The leaves are mixed, in the still, with the ripe berries in a certain proportion. The ethereal oil of the berries having a much stronger aroma than that of the leaves alone, a bay rum distilled partly from the berries has, therefore, a much stronger odor, and keeps its flavor much longer than if distilled alone from the leaves, but the cost of the berries is also from fifteen to twenty times that of the leaves, since they can only be procured with great difficulty.

The rum used for the distillation must be selected with great care. It must be of the very best quality, perfectly pure, and without any foreign odor. Rum from different sources cannot be used indiscriminately. A good St. Croix rum serves the purpose best, but it must be considerably stronger than what is generally brought into the market from there.

After having thus obtained the proper materials for the distillation, the next care is to be bestowed upon the operation. Distillation by steam, in large copper stills, ensures, to a certain extent, a uniform good quality of distilled bay spirit; it never gets burnt; the distillation is not carried too far; nothing of the fine aroma is lost by this process, which generally is the case by distilling over an open fire. Nearly all the distilled commercial bay rums are prepared over an open fire, to the great detriment of the flavor, but most of the bay rums in the market are not the product of distillation, being simply a solution of bay oil of a more or less good quality in common rum, or even in alcohol.

A comparison of bay spirit distilled from fresh material by steam

with other bay rums will at once show the difference, the former being much stronger and finer in odor, so that a small quantity of it has not merely the same strength as a larger quantity of the others, but its odor will be found to be much more lasting and agreeable.

Bay spirit is used as a wash for the face, the hands, and the whole body, refreshing and invigorating the skin, and is highly valued for soothing the soreness after shaving, when diluted with water. A bath to which about a quarter of a bottle of bay spirit is added strengthens the flesh, takes away the heat and dryness of the skin, gives softness and strength to the tired limbs, destroys all smell of perspiration, and produces a feeling of invigoration. In the sickroom it is invaluable, as well for the sick person as for those around him; it purifies and refreshes the air in a remarkable degree. It is inestimable to travelers, especially in hot climates or in summer in the North, quickly relieving the feelings of lassitude of voyages. In fact, its uses are numberless, and, while other perfumes quickly sicken many persons with excess of fragrance and the pungency of their aroma, the consumer will never get tired of using a good bay spirit.

St. Thomas, D. W. I., February, 1882.

EXTRACT OF VANILLA.

By George W. Kennedy, Ph.G.

The object of the writer is to present to the numerous readers of this journal a reliable formula, which has, in his hands, proved very satisfactory during the past eight or ten years that it has been used. Prior to that time I had experimented considerably with menstruums of various alcoholic strength, and also with mixtures containing glycerin. I obtained good results from some, but the formula I have adopted I prefer to all others, and am satisfied that even the inexperienced can manufacture a good preparation, provided they use a good quality of bean and carry out the manipulation properly. The formula does not differ materially from the many in general use, both as to alcoholic strength and the quantity of bean used, although some pharmacists use less than one ounce to the pint; but to insure uniformity throughout the country, I think that the strength indicated should be generally adopted.

For exhausting the vanilla, various writers have suggested simple percolation, repercolation, digestion — both with a cold and warm

menstruum and either for a limited or an unlimited period—and prolonged maceration followed by percolation. The writer prefers simple percolation, which, of course, requires to be skillfully managed. Some writers have recommended strong alcohol as a menstruum. This, I believe is unnecessary, as it is a waste of alcohol, making the preparation more expensive without obtaining better results. I have found 50 per cent. alcohol to answer the purpose admirably, and as vanillin, to which the odor is due, is soluble in this menstruum, it is, in my judgment, the most desirable one to use.

As there are many varieties of vanilla in the market, attention should be given as to its selection. A good quality, although perhaps decidedly more expensive at the outset, will be the cheapest in the end for preparing the extract. There is an inferior kind of Mexican vanilla sent into the market, cut up into small pieces of an inch or a little more in length, which consists of beans unfit to be bundled up, and is offered at the low price of $5 per pound. It is unwise to purchase vanilla in a broken condition. In the manufacture of an extract only a good quality of Mexican bean should be used, which has a peculiar, agreeable, characteristic odor of its own, whilst some of the other kinds have an odor resembling that of tonka, which, in my judgment, makes those varieties decidedly objectionable. You might almost as well use a certain percentage of tonka bean as the lower kinds of vanilla for the purpose of making a cheap flavoring extract. A preparation should be sold be sold for what it is, and nothing else. If it contains tonka call it, say, compound extract of vanilla for flavoring, or any other suitable name, but, above all, do not throw it upon the market as extract of vanilla. There are those people perhaps, though very few, who prefer the odor of tonka, which is due to coumarin, but for their use an extract of tonka could easily be prepared.

A short time ago I was offered, by a traveling salesman, a bean at $4 per pound. He stated for extract purposes it was just the thing, and was largely sold to ice cream makers and others. They were about six inches long, bright brown in color, quite dry and brittle, void of odor, and would remind one of a bean that had lain in alcohol for weeks, taken out and dried. Cheap and worthless extracts of vanilla appear to be largely sold, and perhaps mainly by grocers.

The formula proposed is as follows:

Take of	Good Mexican vanilla, ...	℥iv
	Sugar (granulated), ...	℥iv
	Alcohol, water, of each a sufficient quantity.	

Cut the bean transversely into small pieces, place the sugar and the cut bean into an iron mortar of convenient size, and reduce to as fine a condition as practicable, after which moisten the powder with a mixture of alcohol and water in proper proportion, so as to obtain a menstruum containing not less than fifty (50) per cent. of alcohol; then carefully pack the moistened powder in a cylindrical percolator, close the lower orifice with a cork, pour on more menstruum of the same strength (sufficient to cover the surface of the powder), cover the top of the percolator, and allow it to remain undisturbed for twenty-four hours; then remove the cork and permit percolation to proceed, not faster than at the rate of 40 drops per minute, and continue until four pints have passed, when the preparation is completed.

A similar formula was published in this journal, 1876, page 342.

THE BARK OF FRAXINUS AMERICANA.

Abstract from two Theses presented to Philadelphia College of Pharmacy.

The White or American Ash grows from Nova Scotia and New Brunswick to the western shores of Lake Superior, southward to Florida and Louisiana, and westward to Eastern Nebraska and Kansas. It attains a height of sixty to eighty feet, the trunk being from four to six feet in diameter. The wood is light, tough, very strong and elastic, and is extensively used in the manufacture of agricultural implements, carriages, oars, cabinet-work, etc. The bark is collected from the trunk and root, the latter being preferred. As seen in commerce it is usually in pieces varying from three to six millimeters (one-eighth to one-quarter inch) in thickness, from twenty-five to seventy-five millimeters (one to three inches) in width, and sometimes fifteen centimeters (six inches) in length. The suberous tissue being generally removed from the old bark, this is externally whitish or grayish-yellow, sometimes reddish or brown-red, frequently with irregular longitudinal ridges and warts from adhering cork; internally it is yellow and smooth. Its transverse fracture is very fibrous, its odor is slightly aromatic, and its taste bitter and slightly acrid.

John M. Bradford, Ph.G., determined the amount of extract obtainable by different menstrua. The experiments appear to have been made with air-dry bark, and the amount of moisture left in the extracts does not appear to have been ascertained. In each case 1,000

grains of the powdered bark were exhausted by percolation, and the resulting liquor evaporated in a water-bath; the yield was as follows:

1.	Menstruum:	strong alcohol, . .	yield:	22·4	per ct.	extract.
2.	"	alcohol 4 parts, water 1 part,	"	26·2	"	"
3.	"	alcohol 4 parts, water 2 parts,	"	28·2	"	"
4.	"	alcohol 4 parts, water 3 parts,	"	29·0	"	"
5.	"	alcohol 4 parts, water 4 parts,	"	31·6	"	"
6.	"	alcohol 3 parts, water 4 parts,	"	31·6	"	"
7.	"	alcohol 2 parts, water 4 parts,	"	31·6	"	"
8.	"	alcohol 1 part, water 4 parts,	"	31·8	"	"
9.	"	water (percolate turbid),	"	28·8	"	"

All the extracts had a bitter taste, and the bitter principle is therefore soluble both in alcohol and water. The alcoholic extracts were soluble in water, leaving no perceptible residue, but yielding a slightly cloudy solution from suspended resin.

The bark exhausted with ether, and the ether evaporated spantaneously, yielded a fatty matter lighter than water, and having a green tint, which changed to a yellow-red color on heating to the boiling point.

On distilling the bark with water a minute quantity of volatile oil and a white substance was obtained, the latter subsiding in the distillate. The bark was also found to contain starch, gum, tannin and a bitter principle.

Howard M. Edwards, Ph.G., examined a sediment from the wine of white ash bark, and found in it an acid and a neutral resin, sugar, gum and other matters.

In analyzing the bark, the powder was exhausted with a weak alcohol of 15 per cent., the liquid was evaporated to a syrupy consistence and mixed with alcohol, which produced a light-red precipitate of gummy matter having a sweetish and slightly pungent taste, the pungency being probably due to a little resin. The filtrate was concentrated and precipitated by water, a pungent resin having an acid reaction, separating, while the filtrate gave decided indications of the presence of an alkaloid both by Mayer's test and by solution of iodine. This last filtrate was precipitated by subacetate of lead, a thick yellow precipitate being obtained, and the filtrate after having been freed from lead by sulphuretted hydrogen, yielded precipitates with tannin picric acid and ammonia. After adding ammonia, the liquid was shaken with ether, which dissolved the precipitate, leaving the ammoniacal solution slightly red. The etherial liquid, on being evaporated

spontaneously, left no crystals, the alkaloid being contaminated with other substances. The amount of alkaloid being so small, I was not able to carry the investigation further. The alkaloid showed an alkaline reaction with litmus and had a bitter taste; it is doubtless the active principle of the drug.

A decoction of the bark was found to contain sugar and starch; but neither tannin nor gallic acid was found; the reactions which were at first thought to be those of gallic acid, were afterwards shown to be due to coloring matter and acid resin. Ferric chloride gave a blueish-black color; but gelatin and tartar emetic gave no precipitates. (J. M. Bradford obtained a precipitate with gelatin.)

The decoction was precipitated by acetate of lead, the precipitate washed, suspended in water, decomposed by H_2S, filtered, heated and then tested: ferric chloride gave a blue color; gelatin solution, tartar emetic, lime solution and ferrous salts gave no reaction; but sodic hydrate gave a brown color.

The volatile oil, obtained by distillation with water, was aromatic and had a bland taste.

The following pharmaceutical preparations were made:

The *tincture*, made with 20 per cent. alcohol, four troyounces to the pint, was bright red, slightly aromatic, of a bitter taste, and exposed to the cold became slightly turbid.

The *fluid extract*, made with a menstruum composed of water eleven parts, glycerin one part and alcohol four parts, was deep red or blackish red, very bitter and slightly pungent.

The *extract* was made with 20 per cent. alcohol; yield, seven parts from twenty-four parts of the drug; it is of a blackish-red color and has an extremely bitter and burning taste.

ANALYTICAL RESEARCHES AND INVESTIGATIONS.

COLLATED BY PROF. FREDERICK B. POWER, PH.D.

The Estimation of Glycerin in Sweet Wines. By Dr. E. Borgmann. —The author calls attention to the difficulty of correctly determining the amount of glycerin in wines which still contain much unfermented sugar. According to the method of Reichardt, as modified by Neubauer and the author, the sugar by the treatment with lime becomes converted into saccharate of lime, which adheres so closely to the sides of the dish that it can only be removed with great difficulty. For this

reason the author proposes the following modification of Reichardt's method, when it is required to estimate the glycerin in wines containing sugar. 100 cubic centimeters of the wine are evaporated with a little quartz-sand upon the water-bath to dryness. The residual syrupy mass is then successively extracted with absolute alcohol (100 to 150 cubic centimeters, according to the amount of sugar), and the liquids subsequently mixed in a large glass flask. For 1 part of applied alcohol 1½ part of ether is added, the mixture well shaken, and then allowed to repose until the liquid has become perfectly clear. The larger portion of the sugar will be deposited as a syrupy mass, while the entire amount of glycerin will be contained in the alcohol-ether solution. The clear solution is then poured off from the deposit and the latter again washed with small amounts of a mixture of 1 part of alcohol and 1½ part of ether. The combined solutions are then distilled, the residue brought into a porcelain dish with the aid of a little water, and further treated as in the case of an evaporated wine containing no sugar, according to the usual method.—*Zeitsch. für Analyt. Chemie*, 1882, xxi, p. 239.

Purification of Carbon Bisulphide.—P. Palmieri recommends, after removing the aqueous layer with which commercial carbon bisulphide is usually covered, to add to every 100 parts of the latter from 2 to 3 parts of anhydrous cupric sulphate, and subsequently well agitating the mixture. When the cupric sulphate, which becomes perfectly black, is deposited and the odor of sulphuretted hydrogen is no longer perceptible, the liquid is filtered or decanted. Absolute purity is obtained when the carbon bisulphide is again rectified over anhydrous cupric sulphate. In order to maintain the carbon bisulphide, which in this manner is said to lose all disagreeable odor, permanently pure, it may be allowed to remain in contact with a little anhydrous cupric sulphate. The employed cupric sulphate may be made available for further use in purification by ignition, treatment with sulphuric acid, and subsequently again igniting. E. Allary (*Bull. de la Soc. Chim.*, 35, p. 492) covers the carbon bisulphide to be purified with an aqueous layer, and then adds gradually, with active agitation, a solution of potassium permanganate until the aqueous layer remains permanently red. The product is then washed with water, and finally separated in a separatory funnel. In most cases a further purification by rectification is not necessary.—*Ibid.*, p. 255.

The Detection of Water in Alcohol and Ether.—According to the

observations of C. Mann, when 2 parts of citric acid and 1 part of molybdic acid are heated together in a porcelain capsule until they begin to fuse, a dark blue mass is obtained, which dissolves in water with a slight yellowish-brown color. If strips of paper are moistened with the liquid, and dried at 100°C., they appear blue, but lose this color again when dipped in water. The strips of paper thus prepared are adapted for determining the presence of water in alcohol and ether, the latter bodies having no action upon the blue color; but if they contain water decoloration ensues, and the quicker in proportion to the amount of water present.—*Ibid.*, from *Archiv der Pharm.*, 1882, 17, p. 122.

Examimation of Blood Stains. By Victor Schwarz.—The separation of blood from its solutions (in well-water, soap-water, salt-water or normal urine) for the formation of Teichmann's hæmin crystals by means of precipitation is more successful with the use of acetate of zinc than with tannic acid. For the solution of dried blood stains upon linen the ordinarily employed potassium iodide is well adapted, and the obtained liquid is precipitated by acetate of zinc. The spots may also be extracted by digestion for 48 hours at the ordinary temperature with a cold saturated solution of borax, and to the liquid a solution of acetate of zinc added as long as the precipitate appears colored; by the further addition borate of zinc will be precipitated, which prevents or retards the formation of the hæmin crystals from the precipitate. By the previous extraction with borax the preparation containing the hæmin crystals must eventually be warmed again with glacial acetic acid, in order to dissolve foreign substances, before the crystals become distinctly visible. The extraction of mixtures of blood with sand, earth, turf, etc., is best accomplished by means of a cold saturated borax solution, much less effectually with potassium iodide, as the blood solution with the latter decomposes very quickly, so that after a few hours a blood spectrum, which at first is plainly visible, can no longer be detected. In opposition to an older statement of Wessel the author has repeatedly succeeded in forming the hæmin crystals from blood which had become completely decomposed, and possessed a penetrating odor.

According to Struve the detection of blood in suspected spots is most difficult in those which have a very pale color, and which are only observable by means of the sharper contour of the edges. In order to furnish the proof a large segment of the fabric containing the

suspected spot is treated in a suitable glass with a dilute solution of potassa. When the coloration of the alkaline liquid appears no longer to increase the liquid is poured off and the fabric washed with water. The obtained liquids, which are usually turbid, are filtered, a solution of tannin added, whereby the liquid instantly assumes a deeper reddish-brown color, and then made just perceptibly acid with dilute acetic acid; at once or after some time a more or less colored precipitate is separated. The latter is collected upon a filter, washed with water, and two portions of the same brought upon two object glasses. After the addition of a trace of salt they are allowed to dry, and the blackish residue treated in the ordinary way with acetic acid, in the one case with the aid of heat, in the other at the ordinary temperature. After standing quietly for some time, from 20 to 24 hours, the hæmin crystals are sought first in the preparation formed with the aid of heat and afterwards in that prepared in the cold. With the former the crystals are found on the edge of the object glass, with the latter in the middle of the object; the last obtained result is conclusive.

By means of the microscopic examination the author distinguishes with certainty between the blood of mammals (round blood corpuscles) and the blood of birds, etc. (elliptical blood corpuscles with nucleus). In no case can one state, however, with absolute certitude whether a blood stain proceeds from the blood of a man, an ox, a horse, sheep or goat, and only in rare cases can the personal view be expressed, that according to the size and grouping of visible blood corpuscles a stain proceeds from the blood of a sheep or a goat and not from the blood of an animal with larger blood corpuscles.

From the importance of this statement the observations of Schmid in the same connection may be noted. The latter brings the detached blood stain into a watch-glass, allows it to stand with a few drops of a 30 per cent. potassa solution for from 24 to 48 hours, brings it then upon a glass plate, and, when the potassa solution has acted sufficiently, it may be finely divided by means of a needle. A few drops of a fresh 30 per cent. potassa solution were then added, and about 50 of the isolated blood corpuscles measured under the microscope. From the result of these tabulated measurements Schmid concludes as follows: If it be required of the expert to state whether a stain proceeds from the blood of a man or from that of an animal, the first question under certain circumstances may be definitely answered, the second, however, only conditionally.

Struve finally calls attention to the fact that blood stains through the vegetation of mould may become so changed that by the microchemical examination they will yield neither the hæmin crystals nor permit the detection of the structural elements. The color of such dark stains does not proceed from the coloring-matter of the blood, but from fibrin; they are soluble in dilute soda solution, and the solution yields the different reactions of albuminous matters.—*Ibid.*, pp. 311 to 315.

On the Crystallizable Yellow Coloring Matters of Galangal. By E. Jahns.—In the year 1839 Brandes discovered in the galanga rhizome a substance to which the name of *kampferid* was applied. The author has now determined that the latter is a mixture of three different bodies, to which he has given the names of *kampferid, alpinin* and *galangin.*

1. *Kampferid,* $C_{16}H_{12}O_6$, crystallizes from alcohol in sulphur-yellow flat needles, which melt at 221–222° C., are almost insoluble in water, and sparingly soluble in alcohol. It crystallizes with one molecule of water of crystallization, which is expelled at from 130 to 140°C.

2. *Galangin,* $C_{15}H_{10}O_5$, crystallizes from absolute alcohol in bright yellow flat prisms, which in two molecules contain one molecule of alcohol of crystallization; from dilute alcohol it crystallizes in yellowish-white silky needles, containing one molecule of water of crystallization. Galangin is soluble in 34 parts of absolute and in 68 parts of 90 per cent. alcohol.

3. *Alpinin,* $C_{17}H_{12}O_6$, crystallizes in yellow needles, with one molecule of water of crystallization; it melts at from 172 to 174°C.

By oxidation with nitric acid, kampferid yields anisic acid, while galangin gives benzoic acid; in both cases oxalic acid is also formed.—*Chem. Zeitung,* 1682, No. 17, p. 328; from *Archiv der Pharm.,* 17, p. 161.

Chemical Examination of Tanacetum vulgare. By O. Leppig.—The author has determined in the flowers as well as in the herb of tansy the following principal constituents: tanacetin, tannic acid, gallic acid, volatile oil, fatty matter, a waxlike substance, mucilage, albuminous matter, tartaric, citric, malic and oxalic acids, a lævogyrate sugar, resin and meta-arabinic acid. The bitter principle, tanacetin, is contained chiefly in the flowers; it is amorphous, and has the composition $C_{11}H_{16}O_4$. With concentrated sulphuric acid it becomes

yellow, then brown, after a short time reddish-brown, and finally changing to a dark blood-red color. The edge of the liquor becomes bounded by a narrow blue ring, which, when stirred by means of a glass rod, shows blue stripes. The tanacetum-tannic acid corresponds to the formula $C_{23}H_{29}O_{31}$; on boiling with dilute hydrochloric acid it appears to become decomposed into sugar and catechin.—*Ibid.*; from *Pharm. Ztschr. f. Russ.*, 21, pp. 141, 169 and 193.

On Galactin. By A. Muntz.—The author has extracted from leguminous seeds a substance to which the name of galactin is applied, and which is considered as a definite chemical principle. It is obtained by treating powdered lucerne seeds with water containing a little neutral acetate of lead. To the liquid thus obtained a slight excess of oxalic acid is added, which precipitates the lead and the lime, after which to the clear liquid one and a half times its volume of 92 per cent. alcohol is added. A white mass is thus obtained which remains attached to the rod with which the liquid is stirred. The mass is expressed, washed with water containing a considerable amount of alcohol, then re-dissolved in water and precipitated a second time by alcohol.

When thus prepared, and dried by exposure to the air, it presents the form of white, translucid nodules, containing a small quantity of mineral matter. It swells in water, then dissolves slowly, similarly to gum arabic. The solution is viscid, but limpid; it is not precipitated by the neutral, but by basic acetate of lead, and shows the same deportment to metallic compounds as gum arabic. Its composition is that of the latter, $C_6H_{10}O_5$; it is dextrogyrate, and its rotatory power with sodium light is $+84{\cdot}6°$. When treated with nitric acid it yields a large amount of mucic acid. When treated at the temperature of 100°C. with dilute mineral acids, it is slowly transformed into saccharine matters, which, when brought to the consistence of a syrup, yield hard, brilliant crystals, readily obtained pure by repeated crystallization from alcohol; there then remains also an uncrystallizable sugar. The crystals are but sparingly soluble in cold alcohol, but dissolve in boiling alcohol, from which they are deposited in the form of a crystalline crust. Their taste is slightly saccharine; but they are very different from arabinose, a sugar which is generally obtained by treating gum with dilute acids. In all their properties they approach more closely to the *a* galactose of Fudakowsky, which is obtained by the decomposition of sugar of milk. A comparison with galactose has confirmed the identity of the two products, they having the same rota-

tory power and the same melting point, 161°C., while the melting point of arabinose is 143°C.

The gum of the seed of lucerne is thus a distinct substance, and in consequence of yielding the same products of decomposition as sugar of milk by the action of dilute acids, the name *galactin* is applied. It is abundant in vegetable products, in the seeds of the leguminosæ, and particularly in those which contain no starch. It appears to be localized in the testa, of which that of the seed of lucerne contains 42 parts by weight in 100. It is digested by animals, but cannot be saccharified, however, by the saliva or by the pancreatic juice. From the remarkable property of this body in yielding galactose, the author thinks it possible that it may form a portion of the material from which the herbivorous females derive the elements of sugar of milk, secreted by their organs of lactation, and the origin of which is still enveloped in mystery. The sugar of milk is of rare occurrence in the vegetable kingdom, and has been found with certitude only in the juice of the sapodilla.

The very extended distribution in the vegetable kingdom of the above described substance, which is employed in alimentation, shows that the elements of sugar of milk are at the abundant disposition of herbivorous animals.—*Rép. de Pharm.*, 1882, No. 3, pp. 107–109.

METHOD FOR THE ESTIMATION OF TOTAL ALKALOIDS IN BARK.

By Dr. J. De Vrij.

Abstract of a paper in the Nieuw Tijdschrift voor de Pharmacie in Nederland, January, 1882.

In the "Archiv der Pharmacie" for August, 1881, two methods for the estimation of the total alkaloids in bark were proposed by Prollius, one of which the author has tested and now recommends as yielding, with a slight modification, excellent results.

The principle of the method referred to consists in using for the extraction of the alkaloids a mixture of 88 parts (by weight) of ether, 8 of alcohol (92 to 95 per cent.), and 4 of liquid ammonia. Prollius directs 10 grams of this liquid to be taken for every gram of bark, but the author recommends the proportion of menstruum to be doubled.

The following is the method as modified by the author: 10 grams of finely-powdered bark are introduced into a well-closed bottle and, after being carefully tared, 200 grams of the ethereal liquid are added. The whole is now shaken at intervals during an hour, this length of time having been ascertained by comparative experiments to be sufficient. The bottle is then again weighed and, if evaporation have taken place, the necessary quantity of ether mixture is added.

As much as possible of the clear liquid is now poured off into a flask, and the bottle again weighed; the difference in weight gives the amount of solution taken. The ether is then recovered by distillation, and the residual liquid, containing alkaloid and waxy matter, is transferred to a tared porcelain dish and glass rod, the flask being washed with a little spirit. The evaporation is now continued on the water-bath until the weight is constant. This gives the amount of crude alkaloid. For instance, 10 grams of succirubra bark were digested with 200 grams of ethereal liquid. 159·8 grams of the clear solution gave a residue of 0·78 gram, or 9·76 per cent. of crude alkaloid.

To estimate the pure alkaloids, the crude residue is dissolved in dilute hydrochloric acid, filtered, washed as long as the washings precipitate with solution of soda, and the whole made alkaline and shaken with chloroform. After standing twelve hours, the clear chloroformic solution is run into a flask and evaporated by distillation. The residue is transferred, with a little spirit, to a tared dish and stirrer, and heated on the water-bath till the weight is constant. Particular attention should be paid to the latter point. In the instance referred to, 0·648 gram of alkaloid was obtained, equivalent to 8·11 per cent., or about $1\frac{1}{2}$ per cent. less than the amount of crude alkaloid. The author is of opinion that by estimating the crude alkaloid and deducting $1\frac{1}{2}$ per cent., a result will be arrived at with loss of but little time, which, for the practical purposes of the pharmacist, will be sufficiently near the truth. Of course the same method is applicable for the examination of the ext. cinch. liq. (De Vrij).

From a sample of cinchona bark, 10·01 per cent. of pure alkaloid was obtained, whilst a former estimation, by the lime and spirit method, had yielded 10·02 per cent. The close agreement of these two determinations confirms the reliability of this method, which the author confidently recommends.—*Phar. Jour. and Trans.*, March 12, 1882.

THE BOTANICAL SOURCE OF CINCHONA CUPREA.

BY JOSÉ TRIANA.

Since the publication of my "Nouvelles Études sur les Quinquinas," Dr. Hesse has remarked the appearance in commerce of a new bark which differed from those of all known cinchonas in its aspect, density, texture and color, etc., but which contained alkaloids characteristic of the true cinchonas. Subsequently, Professor F. A. Flückiger, in the "Neues Jahrbuch f. Pharmacie," xxxvi, 296, stated that the same bark differed considerably from the cinchona barks in its anatomical structure, which he compared to that of *Cascarilla magnifolia*, and gave to the new bark the name of cuprea cinchona, on account of the dull coppery tint of its external surface.

During the last few years especially there have been introduced into Europe considerable quantities of new barks, which have maintained in commerce the name of "cuprea bark," and the importations have been so large that the price of all cinchona barks and of sulphate of quinine have been very sensibly lowered.

The chief emporium and centre of exportation of the cuprea barks is Bucaramanga, in the State of Santander, and the trees which yield them are found in abundance in the mountain chain of La Paz, which breaks off from the great eastern branch of the Columbian trifurcation of the Andes, and runs parallel to the course of the Magdelena river, separating it from its affluent, the Suarez. At first there was only one firm in Bucaramanga which exported the bark, and by keeping secret the use to which the bark was destined, it succeeded for some time in maintaining a kind of monopoly. But attention having been roused by the regular exportation, it at length became known that these barks were considered to be the produce of cinchonas, and much valued in Europe; from that time an eager search was made for them, and their exportation soon assumed such proportions that the bark market became rapidly overloaded and supplied with sufficient to last for a long time.

The impetus having once been given, the search for cuprea bark was prosecuted in other forests of Columbia, and barks quite equal to those of Bucaramanga were found towards the base of the great eastern branch of he Cordillera of the Andes, and as far as the great plain which extends to the Orinoco, and in the valleys of the rivers

Meta and Guaviare, affluents of the river Orinoco, and these barks pass in commerce under the same name as those first discovered.

The cuprea bark at present in commerce is therefore furnished by two very distinct regions: the one, just described, in the great basin of the river Orinoco, to the South of Bogotá, and the other, which was the one first explored, in the lower part of the basin of the Magdalena river.

Amongst the numerous cuprea barks received from Bucaramanga, or the northern region, there is occasionly found a relatively small quantity, which has been discovered by M. Arnaud to be peculiar in containing, in place of quinine, a new alkaloid which he has called cinchonamine.

Professor Planchon has also observed that the anatomical structure of the bark containing cinchonamine differs from that of ordinary cuprea bark, and has compared it to that of a *Cascarilla*. He concludes that if the cuprea barks have characters in common which place them outside the genus *Cinchona*, they also present between themselves such differences that they ought to be considered to form specifically distinct types.

Hitherto, the plant or plants which produce cuprea barks have been unknown to science, although the barks have taken so considerable a place in commerce and in the manufacture of sulphate of quinine. Desiring to fill up this gap from a botanical point of view, I made strenuous efforts to obtain in Columbia, specimens of the plants yielding the cuprea barks, and my efforts have been in great measure crowned with success. I have just received documents from the two centres of collection above named, which now enable me to determine and classify the trees which furnish the cuprea cinchona, and to establish their botanical nomenclature. This classification and other facts shortly to be mentioned raise points which seem to me to be of the highest interest in relation to science, commerce, and the cultivation of cinchonas, and to these points I have now to call attention.

The barks distributed in commerce at the present time under the name of cuprea bark are afforded by two distinct districts. They also belong respectively, at least, to two distinct species which, though nearly allied, are yet different from each other and belong to the genus *Remijia*, which comes very near that of *Cinchona* and to the closely allied genus *Cascarilla*. These species are *Remijia Purdieana*, Wedd. ("Ann. Sc. Nat." [3], xi., p. 277), a plant formerly discovered by

Purdie in the forests of Antioquia, upon the left bank of the Magdalena; and *Remijia pedunculata*, Triana (*Cinchona pedunculata*, Karsten, "Spec. Select." i., 53, t. 26).

My identification of the tree from the valley of the Magdalena river is founded upon the only samples that I have received of the cinchonamine-yielding sort, which are identical with those of Purdie. I incline to believe that all the other cuprea barks said to come from Bucaramanga, notwithstanding the difference in their chemical composition noticed by M. Arnaud and the not less remarkable difference in their anatomical structure indicated by M. Planchon, can only be produced by the same botanical species, viz., *Remijia Purdieana;* inasmuch as (1) the barks containing cinchonamine have been exported to Europe as being those of cuprea, without any distinction being made between them, except in remarking that the trees from which the bark was obtained grow in a warmer locality at a lower elevation than the others without, however, indicating tbat they might be different among themselves; and (2) if the trees worked in the northern districts be distinct, the resemblance between the one which is most abundantly exported from Bucaramanga, and which must have been used as a standard of comparison to discover the cuprea bark in the south, would be less than that which exists between *Remijia Purdieana* and *R. pedunculata*, which is very great at first sight.

The difference in the conditions of vegetation where the trees yielding the two kinds of cuprea bark of Bucaramanga grow would suffice, it seems to me, to explain the change in the nature of the alkaloids and the modifications in anatomical structure observed in them. In any case this is a question that I hope I shall be able to solve when samples of the common cuprea of Magdalena, which I am expecting to receive shortly, shall have arrived. But there can be no doubt that if these trees are distinct they must belong to very closely allied species of the same genus.

With regard to the southern district, I am in possession of specimens gathered at Susumuco, Villavicencio, Papamene and on the banks of the Guaviare, etc., localities distant from each other and varying in elevation above the sea level from 200 to 1,000 meters. Notwithstanding slight variations, which cannot be considered as specific characters, all these specimens answer to *Remijia pedunculata*, Triana, a species discovered by M. Karsten and myself between Susumuco and Villavicencio,

and of which my fellow traveler has published a description and a figure in the "Specimina Selecta."

The two Columbian species of *Remijia* which yield the cuprea barks have, at first sight, a very great resemblance, in habit, in the form, size and smoothness of the leaves, in their inflorescence, and in their capsules of almost the same size; they are in reality, however, very distinct and are easily characterized.

Remijia Purdieana has the divisions of the calyx lanceolate-acute, almost linear, and much longer than the tube of the calyx. The stipules are lanceolate-acute and the capsules are also lanceolate.

Remijia pedunculata has the teeth of the calyx small, triangular and almost rounded at the apex; the stipules are obtuse, broad and abovate and the capsules are shorter than those of *R. Purdieana*, which are elliptic.

The resemblance between the barks of the two species is also very great and it would be difficult to find characters sufficiently marked to distinguish them. They are both, in fact, hard, very compact, relatively heavy, the inner surface smooth and more or less of a wine-red tint, the epidermis thin or more or less corky, and striated longitudinally. The fracture is not fibrous, as in many cinchonas.

The cuprea bark which yields cinchonamine is, however, heavier and more compact and more filled with red resinous coloring matter, and its fracture generally appears to be horny.

The yield of quinine from the cuprea barks varies between ·0 and 2 per cent., according to the conditions of vegetation of the trees, which have not yet been sufficiently studied. In this respect they resemble the officinal cinchonas. In both cases it appears that the alkaloids increase in proportion as the trees approach nearer to the upper limit of their zone of vegetation and are better protected by the great forest.

From a chemical point of view, the characteristic and remarkable feature which distinguishes the cuprea barks from the true cinchonas is the absence of cinchonidine, which has been ascertained by numerous analyses made by M. Arnaud, confirming the results obtained by other chemists.

In cuprea barks, quinidine would also be always proportionately more abundant than in other cinchona barks, which would permit the formation of the double salt of this alkaloid with quinine, and would produce, according to Mr. C. H. Wood and Mr. E. L. Barret, ("Chem-

ical News," vol. xlv, p. 6, and "Moniteur Scientifique," 3d ser., xii, p. 144), the new supposed alkaloid, the discovery of which was announced almost simultaneously in England by Mr. D. Howard and Mr. J. Hodgkin, on the one part, and by Dr. B. H. Paul and Mr. Cownley, on the other part, under the names of "homoquinine" and "ultraquinine."[1]

Neverthless the existence of cinchonamine, the new alkaloid studied and isolated by M. Arnaud in certain cuprea barks, remains unquestioned.

The discovery thus made of febrifuge alkaloids in the barks of a group of plants outside the genus *Cinchona*, as defined by me, renders it necessary to reconsider the characters upon which the genus is founded and to estimate its affinities at their true value.

De Candolle constituted his genus *Remijia* from Brazilian plants which St. Hilaire, in his "Plantes Usuelles des Braziliens," had referred to the genus *Cinchona*, which had previously been made known by Vellozo under the name of *Macrocnemum*. These plants are shrubs which grow on the dry and exposed summits of the mountains that extend from north to south of the province of Minas, indicating the presence of iron in the soil, according to St. Hilaire.

According to the same author they have bitter barks which singularly resemble those of the Peruvian cinchonas, and bear without distinction the names of *Quina de Serra* (mountain cinchona) or *Quina de Remijio* (the name of the person who first pointed out to the Brazilians their use as a substitute for the officinal cinchonas).

St. Hilaire, while acknowledging that perhaps the "Quina de Serra" plants were only varieties of one species, yet referred them to three, called *Cinchona Remijiana*, *C. ferruginea* and *C. Vellozii*, and these have been retained by De Candolle under the new name *Remijia;* but I believe, in fact, that they ought to be considered as forms of one specific type. De Candolle, adopting the idea of St. Hilaire, who had called one of these species *Cinchona Remijiana*, in order to preserve

[1] Mr. Triana appears to have overlooked the fact that Mr. T. G. Whiffen also made known the discovery of a new alkaloid, to which he gave the name "ultraquinine," and which was probably the same as that referred to by the other observers. As regards the suggestion that this alkaloid is really a compound of quinine and quinidine we are still without any evidence in support of its probability or of the existence of such a compound.—Ed. P. J.—*See Amer. Jour. Phar.*, 1882, p. 75, 76.

the memory of the surgeon Remijo, to whom is due the use of these plants as febrifuges, gave to his genus the name of *Remijia;* This genus is evidently very near to *Cinchona*, and its affinity has been rendered still more close by the discovery of the cinchona alkaloids in the Columbian species of *Remijia;* but it is clearly distinguished from *Cinchona* by its axillary inflorescence, and its capsules dehiscing from above downwards. In the last character, as well as in the analogy of the structure of their barks, the species of *Remijia* approach more nearly to the genus *Cascarilla;* but from this genus they differ in the prominent and remarkable character of the axillary inflorescence, and also by the presence of alkaloids in their barks, which have not hitherto been discovered in the genus *Cascarilla.*

The genus *Remijia* presents, then, characters sufficiently well defined and constant to keep it distinct from the two genera most nearly allied to it, viz., *Cinchona* and *Cascarilla.*

By the chemical composition of their barks, the "remijias" must now take an important place in commerce and in therapeutics by the side of the cinchonas, of which they are becoming rivals, which confirms te foresight of Remijo and St. Hillaire. Henceforth the two groups of plants will be coupled together, and as the name *Cinchona*, given by Linnæus to the tree of which the bark cured the Countess of Chinchon, will recall this fact, that of *Remijia* will preserve an analogous one from being forgotten.

Beside the generic characters which I have defined, the original species of *Remijia*, as well as those subsequently published, have, as De Candolle remarks, "a peculiar stamp which distinguishes them at first sight from the cinchonas, and which consists of a shrubby habit, in the leaves being sometimes in whorls of three, particularly the lower ones, in the branches and inflorescence being covered with a reddish pubescence, and in quadrifid woody capsules." But these distinctions, due to collateral circumstances, diminish in other species, especially in the two Columbian species herein noticed. Their glabrescent foliage, and especially their coriaceous, bipartite and relatively small capsules, give them a considerable resemblance to several of the officinal cinchonas. It is more than probable that it is to this similarity that the discovery of cuprea cinchona, which has undoubtedly been made by persons without scientific qualifications, is due. Perhaps a botanist would have done as I myself did, when I discovered *Remijia pedunculata*, and would have refused to admit this tree among those

whose barks yield alkaloids, because it could not be ranked among the true cinchonas, and does not correspond in habit with those whose bark abounds in alkaloids.

From the above remarkable facts, there must follow results of the greatest importance to science, cinchona cultivation, commerce and therapeutics.

From a botanical point of view, several ideas concerning cinchonas, which were considered to be sufficiently established, must be greatly modified. For instance, it has been customary to consider that the presence of alkaloids in cinchona was exclusively characteristic of the plants of the genus as hitherto limited, and there have been those who have gone so for as to say that the chemical analysis might serve to control botanical classification, since alkaloids have never been discovered in the genus *Cascarilla* or in other genera allied to *Cinchona*.

It is also admitted that the trees yielding febrifuge alkaloids, especially those of Columbia, as I have stated in my "Nouvelles Études," grow in the elevated regions of the Cordillera of the Andes, where the temperature is mild with scarcely any cold, and prefer the western slopes of the great eastern branch of the trifurcation of the Andes, the other two branches being almost destitute of them.

Since the number of alkaloid-yielding cinchonas has been augumented by the addition of some species of *Remijia*, these plants, regarded as a whole, offer peculiarities worthy of remark, both as to their habitat and their geographical distribution.

The officinal "remijias" of Columbia, as at present known, grow under conditions of elevation, soil, heat and exposure almost the opposite to those which the cinchonas require, and they grow in places only a little above the level of the sea, in the basin of the Magdalena river on one side and in the basin of the rivers Meta, Rio Negro, and Guaviare on the other, without ever reaching the elevated summits of the Cordilleras.

For the cultivation of the species yielding febrifuge alkaloids, whether in their native country or elsewhere, a new and much more extended and varied field is now opened up, and enterprises of this kind will be more numerous and their success more easy and certain. The officinal "remijias," being more hardy and natives of the lower parts of the mountains, loving warmth and not being affected by drought, will lend themselves more easily to cultivation and more especially in

those intertropical countries where the cultivation of the cinchona would be impossible. The cultivation of the cinchonas in the old world will also be affected in consequence.

As to the commerce in bark it has already found in the genus *Remijia* new sources of enterprise in the peculiar conditions and circumstances of its vegetation, which are, as already remarked, different from those of *Cinchona*, and these may be still further increased by the possible discovery of febrifuge alkaloids in other known species of the same genus, natives of Brazil, Ecuador and Peru, or in new ones which may yet be found. Probably also investigation will be made of species of other genera allied to *Cinchona* which have long been overlooked.

I have already remarked that the enormous exportations of cuprea bark that have been made recently have produced a disturbance in commerce, which has lowered the price of the officinal cinchonas in general and of sulphate of quinine in particular, by the accumulation in Europe of barks intended for the manufacture of suphate of quinine and by the temporary stoppage of the exportation of cinchona barks. This paralysis of business is aggravated in Columbia by the temporary neglect of agriculture, the collection of the cuprea bark proving much more lucrative, and also by the stagnation of capital represented by the value of the bark warehoused abroad, and which is usually held as a balance to meet the cost of imported goods. It happens, therefore, that the industry which ought to prove a new source of riches for Columbia has accidentally become a cause of financial disaster.

It may be hoped that this situation cannot last long and that by degrees an equilibrium will be established. Commercial men will become more prudent, and what is of more significance, the cuprea barks will be diminished in quantity in proportion as the sources of production, already rapidly undergoing devastation, become more exhausted, and the difficulty in collecting the bark becomes greater, as has been the case with the officinal cinchonas.

Finally, investigations of the therapeutic properties of the new alkaloids or compounds of alkaloids discovered in the cuprea barks will present considerable interest. It now appears more than probable that these alkaloids or their compounds have passed unnoticed mixed with sulphate of quinine in the manufacture of this substance on a large scale.

The following is a list of the species of *Remijia* :—

Remijia Hilairii, D. C. (Prod., iv, p. 357).—*Syn.* Cinchona Remijiana, St. Hil., Pl. us. Bras.: Cinchona Velozii and Cinchona ferruginea, D. C.; Remijia Velozii and Remijia ferruginea, St. Hil., *l. c.;* Macrocnemum, Vell.

This species grows in dry and barren places on the mountains of the province of Minas.

R. paniculata, D. C.

A little known plant; a native of Brazil.

R. Cujabensis, Wedd. (Hist. Nat. des Quinq.), 93 adn.—*Syn.* Ladenbergia Cujabensis, Klotsch in Hayn. Arzneigewächse, xiv.

This species inhabits forests in the neighborhood of Bahia, in Brazil.

R. Bergeniana, Wedd., *l.c.*—*Syn.* Cinchona Bergeniana, Mart. in Linn. vi; Litt. Ber., 67; Ladenbergia Bergeniana, Klotsch, *l.c.*

A species indigenous in Brazil.

R. firmula, Wedd., *l.c.;* Ladenbergia firmula, Klotsch, *l.c.*

A native of the banks of the Rio Negro, in Brazil.

R. macrocnemia, Wedd.—*Syn.* Cinchona macrocnemia, Mart. Walp. Repert., ii, p. 507; Ladenbergia macrocnemia, Klotsch, *l.c.*

This species grows on the banks of the Amazon, in Brazil.

R. densiflora, Benth. and Hook., Lond. Journ. Bot., iii, p. 215.

A notive of English Guiana.

R. hispida, sp. n. in Herb. Spruce, No. 3248.

Grows near Esmeralda, on the Orinoco river.

R. tenuiflora, Benth., *l.c.*

A species which is found between Barra and Barcelos, on the Rio Negro in Northern Brazil.

R. Purdieana, Wedd., in Ann. Sc. Nat. (3 ser.), xv., p. 272.

This species, which is one of those yielding the cuprea cinchona bark grows in the forests of both banks of the lower Magdalena, in Columbia, in the provinces of Antioquia and Santander.

R. pedunculata, Triana, Nouv. Études.—*Syn.* Cinchona pedunculata, Karst., Specim. Select., i, 53, t. 26.

This species, which also furnishes the cuprea cinchona of commerce, grows between 200 and 1,000 meters above the level of the sea, on the eastern slopes of the eastern Cordillera, on several affluents of the Orinoco and Amazon rivers, such as the Rio Meso, Rio Negro, Guaviare, Papamene, Zarapote, etc.—*Phar. Jour. and Trans.*, April 22, 1882.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

Wrightia antidysenterica R. Br. (also placed in the genera Nerium and Holarrhena) is known in India as "kurchi bark," and was formerly known in Europe as "conessi bark,"[1] "Tellichery bark" and "codaga pala." In 1858 Haines discovered in this bark an alkaloid, which he named *conessine;* in 1864 Stenhouse obtained the alkaloid and called it *wrightine,* and recently it has been again described as *kurchicine* by Baboo Ram Chandra Dutta, of Calcutta. The impure alkaloid was used by Dr. J. M. Coates in the Medical College Hospital and found to possess decided antipyretic properties and in doses of 3 grains, 3 times daily, to be most effectual where chylopoetic congestions existed, but to be less effectual where the spleen is enlarged and blood anæmic; Dr. Coates holds it to be an excellent adjunct to the ordinary treatment of dysentery, but not as an entire substitute for the ordinary remedies.—*Chemists' Jour.*, March 3; *Drug Reporter.*

Gloriosa superba.—Prof. C. I. H. Warden, of Calcutta, has isolated from the root a yellow, non-crystalline neutral principle, *superbine,* to which the formula $C_{52}H_{60}N_2O_{17}$ has been assigned. It is readily soluble in water, alcohol, chloroform and dilute acids, and yields a white precipitate with tannin, but is unaffected by other reagents. It is extremely poisonous, 0·0107 gm. being a fatal dose for a large cat.

The plant contains also a neutral and two acid resins, salicylic acid, methyl salicylate and a fluorescent principle.—*Chemists' Journal,* March 3; *Drug Reporter.*

Thevetin (see page 177, April number) has been obtained by Prof. Warden as a white crystalline glucoside, slightly bitter, with a faint metallic taste, rapidly followed by a pricking and numbing effect on the tongue. 0·01 gm. injected into the stomach produced no apparent effects; 0·1 gm., however, was fatal in 25 minutes, death being produced by most violent convulsions. The analytical results of thevetin dried at 145° C. were C, 57·408; H, 7·478; O, 35·114, more of H and less of O being found than was obtained by Blas.—*Ibid.*

Ixora Bandhuca Roxb. s. I. coccinea, *Lin.*, var. Bandhuca, *Kurz,* is an East Indian shrub of the order Rubiaceæ. The root has been used for a long time as a remedy in intermittent fevers, in hæmoptysis and

[1] Some authors have referred conessi bark to Echites pubescens, Buchan. —Editor.

externally in various cutaneous diseases. More recently it has been recommended in diarrhœa and in dysentery, according to the "Indian Medical Gazette," preferably in the form of tincture made from four ounces of the bruised fresh root and one pint of alcohol. A compound tincture is obtained by adding three drachms of powdered long pepper. The dose is from 30 to 60 grains, three or four times a day. It has an agreeable aromatic taste.

Diastatic Ferment in Egg Albumen.—F. Selmi observed that a filtered aqueous solution of albumen, on being digested with a solution of starch, converts the latter into sugar. The ferment is not precipitated from the aqueous solution by alcohol, and may be obtained in the solid condition by evaporation at a low temperature.—*Monit. scient.*, xii, 70; *Chem. Ztg.*, 1882, 47.

Oil of Satureja montana, Lin.—This plant, grown on the mountains in the neighborhood of Grasse, was subjected to distillation, 150 kilos yielding about 125 grams of volatile oil. This was examined by A. Haller, who found it to be of a yellowish-orange color and of an odor resembling that of origanum. It is a thin liquid, has the density 0·7394 at 17°C., deviates polarized light to the left, and consists of two hydrocarbons, with 35 to 40 per cent. of carvacrol and a small quantity of an oxygenated body, boiling below 235°C. One of the hydrocarbons distils between 172 and 175°, the other between 180 and 185°C.—*Jour. Pharm. et Chim.* March, 1882, 357 to 360.

Constituents of Codliver Oil.—From an investigation made by P. Carles mainly on the presence of phosphorus and iodine in codliver oil the author has come to the following conclusions:

That through improvements in the method of extracting oil from cods' livers the old crude oils have been replaced by improved slightly colored clear oils, having an odor and taste which are not disagreeable, and which can be borne by stomachs that tolerate sardines, anchovies, etc.

That of these different oils the modern natural pale oils are in every respect to be preferred to the brown empyreumatic oils.

That, independently of their physical and organoleptic properties, the golden green virgin oils ought to be esteemed the best, as they are the lightest for the stomach, having scarcely any acidity and no acridity. (The acid calculated as acetic acid varied from 0·01 per cent. in a white oil to 1·80 per cent. in an ordinary brown oil.)

That all kinds of codliver oil contain infinitesimal quantities of

iodine, doubtful traces of bromine and small quantities of combined phosphorus, so that it is difficult to see in any of these elements the cause of the reconstituent action of the oil.

That the active principle appears to reside nearly entirely in the peculiar fatty body itself, which is present unaltered in virgin oils.

Finally, that these modern virgin oils constitute a product essentially assimilable, and that their association with another medicine does not injure its tolerance or therapeutic action.—*Phar. Jour. and Trans.* 1882, Jan. 25, p. 604-606; *Répertoire*, Jan.

Euphorbium is used, according to "Pharmacographia," as an ingredient in the preparation of a durable and non-corroding paint, chiefly for painting ships' bottoms to repel marine animals, in consequence of its acrid nature. John R. Jackson states that for this purpose euphorbium has of late years been largely used; the supply, however, from Morocco, has been limited, and the company manufacturing the paint was at one time compelled to obtain its supply from a species of Euphorbium growing in Natal, but owing to carelessness in collecting this source had to be abandoned. From a correspondence between the British Foreign office and the consuls in Morocco it is learned that the plant is indigeaous to the Southern provinces, at the foot of the lower range of the Atlas mountains. When rain has been plentiful at the commencement of the season, followed by successive summer heat, the yield is large, which generally happens every third or fourth year. The plant is about three feet high, grows wild over a large area of open country, and the gum is collected in early autumn, say July to September or October. It is gathered by poor people and taken to the city of Morocco, whenever it is known there is any demand for it; from thence it is brought to the ports on camels at a low rate of transport. Large quantities would be yearly procurable, if the demand was regular and continuous.—*Phar. Jour. and Trans.*, March 4, p. 723.

Recognition of Black and Green Hellebore.—Prof. A. Herlandt recommends exhausting the bruised rhizome of Helleborus niger or H. viridis with boiling water; the filtered decoction, on being boiled with one-third its volume of hydrochloric acid, becomes rapidly turbid and acquires a violet tint. On cooling black flocks are separated which are collected upon a filter and washed with ether to remove fat and resin, when the paper will be of a deep violet color, depending upon the production of helleboretin. The reaction may be obtained with

0·05 gram of the rhizome, which is to be boiled with 10 cc. of water. On the addition of ammonia the color of the flocks changes to dirty yellow, but the original color is restored on the addition of acid. The results are less satisfactory if sulphuric acid is employed in place of hydrochloric acid. The rootlets of hellebore give but slight traces of helleboretin. The reaction is not obtained with the rhizome of Actaea spicata or with senega.—*Jour. Med. Pharmacol. Bruxelles*, 1881, p. 347.

Nigella Seeds.—H. G. Greenish found, that the seeds of *Nigella damascena* yield fluorescent solutions with petroleum spirit, but contain no melanthin, whilst the seeds of *N. sativa* do not yield a fluorescent solution, but contain melanthin (see January number, p. 10). The seeds of the two species are in commerce sometimes found mixed, but may be easily separated by picking when once the eye has become accustomed to recognize the difference; those of N. sativa are obovate, three- or four-sided, and without transverse furrows, the face being finely pitted; those of N. damascena are somewhat angular and the seed-coat is covered with transverse furrows or network.—*Phar. Jour. and Trans.*, Febr. 18, 1882, p. 681.

SALICYLATES OF MERCURY.

By H. Lajoux and A. Grandval.

Abstract of a paper in the Journal de Pharmacie [5], vol. v, p. 39.

Salicylic acid is an acid phenol, and its formula may be written: $C_6H_4\left\{\begin{matrix}CO_2H\\OH\end{matrix}\right.$ From this double function it results that, as a monovalent acid, it can decompose carbonates, and form a first series of salts in which the atom of H in the group CO_2H is replaced by an atom of a monatomic metal. These salts have for their general formula: $C_6H_4\left\{\begin{matrix}CO_2M'\\OH\end{matrix}\right.$ If the metal is diatomic the formula becomes: $2\left(C_6H_4\left\{\begin{matrix}CO_2\\OH\end{matrix}\right.\right)M''$ These salts are the *normal* salicylates.

Like phenol, salicylic acid possesses the property of replacing also the hydrogen of the OH by an atom of monatomic metal. It follows that the salicylates derived from the acid function can further form by direct combination with bases, or by double decomposition, a second series of salts, called *neutral*, which have for a general formula:

$C_6H_4\left\{\begin{array}{l}CO_2M'\\OM'\end{array}\right.$ or $C_6H_4\left\{\begin{array}{l}CO_2\\O\end{array}\right\rangle M''$ These salts are not very stable, and are converted by carbonic acid into normal salts.

Applying these theories to the salicylates of mercury, it will be seen that the existence is possible of two mercuric and two mercurous salicylates.

A. Mercuric Salicylates.—The first idea that presents itself for the preparation of the mercuric salicylates is to try the action of salicylate of silver upon mercuric chloride. But this process is impracticable because of the insolubility of the salicylates which cannot be separated from the chloride of silver. It was therefore attempted to prepare the mercuric salicylate by double decomposition, in allowing a molecule of normal salicylate of soda to react upon a boiling solution of mercuric chloride. Upon cooling, a relatively not very abundant amorphous white precipitate is produced (about 3 grams for 13·5 grams of mercuric chloride). Reagents, however, and even sulphuretted hydrogen, do not give any indication of a trace of mercury in the liquid, which is acid. In this compound the mercury combined with the salicylic acid is completely disguised. In order to detect it by the wet way, it is necessary to heat slightly the salicylate with concentrated sulphuric acid until it becomes flesh-colored, and then add water; the whole dissolves, the liquid becoming decolorized. The mercury can then be detected in the solution by the ordinary reagents. Analysis of this precipitate showed that it consists of the neutral salicylate:

$C_6H_4\left\{\begin{array}{l}CO_2\\O\end{array}\right\rangle Hg''$ This formula explains, up to a certain point the disguising of the mercury, the biatomic Hg'' serving as a link between the oxygen and the group CO_2.

The neutral mercuric salicylate is soluble in solution of sodium chloride, and this explains the relatively small amount of precipitate above referred to; the remainder of the salicylate being held in solution by the sodium chloride formed on the reaction. The acidity of the liquid is due to free salicylic acid.

The reaction is very interesting from a theoretic point of view, since it shows that the neutral salicylate is more stable than the normal salicylate.

The preceding process not being found suitable, the authors tried the reaction of salicylic acid upon yellow oxide of mercury. According to theory it would be necessary to employ a molecule of mercuric

oxide for each molecule of salicylic acid. But in practice it was found that with these proportions in the presence of boiling water no combination takes place, and the yellow tint of the oxide is not sensibly diminished. If, however, without interrupting the boiling, a fresh quantity of salicylic acid be added, the yellow tint diminishes and disappears completely when a second molecule of acid has been added. A white mass is obtained, which, upon cooling and standing, separates into two layers, the lower very dense and amorphous, the upper crystalline, and consisting of interlaced needles of salicylic acid. The whole is collected on a filter and washed with boiling water, and preferably with ether, as the best solvent of salicylic acid, until the ether no longer leaves a residue upon evaporating. The brilliant white amorphous matter left on the filter has the composition of the neutral mercuric salicylate as above indicated. This compound is insoluble in water, ether, and alcohol, and soluble in solution of sodium chloride. It dissolves in aqueous solutions of potassium iodide, and is extremely soluble in potassium cyanide. If a current of sulphuretted hydrogen be passed through the last-mentioned solution, the liquid at length blackens and deposits sulphide of mercury.

Normal mercuric salicylate is obtained by precipitating a dilute solution of salicylate of soda in excess with a dilute solution of mercuric nitrate. The white precipitate produced is collected on a filter and submitted to prolonged washings with water, to remove excess of salicylate of soda and free salicylic acid, until the wash water no longer colors ferric chloride. This precipitate presents all the reactions of the mercuric salts, and its composition corresponds to the formula

$$2\left(C_6H_4\left\{\begin{matrix}CO_2\\OH\end{matrix}\right.\right)Hg''$$

B. Mercurous Salicylates.—These two salts, like the preceding, occur in the amorphous condition.

Normal mercurous salicylate is obtained by double decomposition in precipitating salicylate of soda in excess with a solution, as slightly acid as possible, of mercurous nitrate. The precipitate can be washed with boiling water without fear of decomposition.

Neutral mercurous salicylate is obtained by treating the normal salt just described with great excess of ether, when it breaks up into salicylic acid, which remains dissolved in the ether, and neutral mercurous salicylate, insoluble in ether and water. The ethereal solution is removed by decantation, and the precipitate is washed until the ether

used no longer gives a residue upon evaporation. This salicylate, which is of the color of whey when just treated with ether, has a slightly greenish-gray color when it has been dried at 100°C. It is blackened by alkalies, turns green with iodide of potassium, and gives mercurous chloride with hydrochloric acid.—*Phar. Jour. and Trans.*, March 18, 1882.

PRACTICAL NOTES FROM VARIOUS SOURCES.

By the Editor.

Preservation of Ferrous Sulphate.—The observation of Johanson (see "Amer. Jour. of Phar.," 1882, p. 74), that crystallized ferrous sulphate keeps best in not hermetically closed vessels is explained by W. Rietzel, as being the result of adhering moisture. The crystals of this salt, and notably that obtained by precipitation with alcohol, if thoroughly dried, keep very well in a dry atmosphere and in closed vessels, but not in moist air, when hydrogen dioxide is formed and the oxidation of the salt facilitated. Ferrous sulphate containing 6 H_2O is not oxidized in contact with air.—*Phar. Centralhalle*, 1882, p. 130.

Preservation of Tannate of Lead.—This compound, prepared according to the German Pharmacopœia, in a short time acquires an acetous odor in consequence of the oxidation of the alcohol. If, however, the latter is replaced by an equal quantity of glycerin, the gelatinous tannate keeps very well and may even easily be mixed with lard or with cerate.—*Jour. Phar. d'Alsace-Lorr.*, March, 1882, p. 50.

Nutrient Suppositories.—Mr. H. E. Spencer, L.R.C.P.E., communicates the following to the "Practitioner":

Artificially-digested meat is mixed with a little wax and starch, and made into a suppository. These suppositories are of such a size that the digested and extracted product of twenty ounces of meat from which the insoluble matter is removed is contained in about five suppositories. The convenience of this method is very great. It is easy for most patients to introduce them themselves, and their use is attended with no discomfort whatever in the majority of cases. After an hour or two the waxy basis is frequently returned, the peptone and extractive being absorbed. In some few cases, owing to irritability of the rectum, the whole suppository has returned; but this can be obviated by the addition of a little opium to each suppository.—*Amer. Pract.*, April, 1882. p. 227.

Pencils of Iodoform are prepared by K. Mueller by triturating 92·5 grams finely-powdered iodoform with a solution of 5 grams gum arabic in 2·5 gm. each of glycerin and water until a plastic mass is obtained, which is rolled out to the desired thickness, and cut into pieces of about 10 centimeters (4 inches). Should the mass become too brittle a few drops of water are added. The pencils become dry in about two hours, and to prevent flattening are laid upon wax-paper, creased so as to form a gutter.—*Phar. Ztg.*, 1882. No. 13, p. 92.

Cheap Logwood Ink.—J. Schmieden recommends the following process: Dissolve extract of logwood 750 gm., in 14 liters of boiling water, add 750 gm. of alum, and when dissolved 200 gm. of sulphuric acid, and with continuous agitation 80 gm. of yellow potassium chromate, previously dissolved in 500 gm. of lukewarm water; finally, add a solution of 100 gm. of ferrous sulphate in 300 gm. of crude hydrochloric acid, dissolve in the ink 100 gm. of gum arabic and dilute with water to 20 liters. The ink writes with a reddish color, but on drying is deep black.—*Phar. Ztg.*, 1882, No. 11, p. 78.

Aqua traumatica Sendneri.—Cinchonine sulphate 1·0, alum 2·0 are powdered and dissolved in distilled water 200·0; to this is added tincture of opium 5·0 and tincture of benzoin 20·0. The milk-like mixture is either injected into suppurating wounds or it is applied upon linen or lint; it is a disinfectant, soothes pain, and promotes healing. Quinidine sulphate may be substituted for the cheaper cinchonine salt.—*Phar. Centralhalle*, 1882, p. 133.

Lithium iodide is recommended by Prof. Zeisst, of Vienna, in such cases where other alkaline iodides and iodine preparations are not tolerated. It is conveniently given in pills as follows:

℞	Lithii iodidi, ...	1·50
	Pulv. et extr. quassiæ, . . .	9·50
	ut fiant pilulæ, No. xx	
S.	One pill morning and night.	

For obtaining the salt, a solution of ferrous iodide is first prepared from 127 parts iodine, 33 parts iron filings, and 300 parts water. To this is gradually added 38 parts lithium carbonate, and after decomposition, the liquid is filtered and evaporated in the usual manner.—*Ibid.*, 134.

Ferrand's Laxative Electuary is composed of flake manna 30 grams, calcined magnesia 4 grams, and clarified honey 30 grams. It is used

at the Laennec Hospital for phthisical patients and is given in doses of a tablespoonful before breakfast.—*L'Abeille méd.*, 1882, p. 24.

Glycerin ointment may be obtained of a soft consistence and perfectly permanent by preparing it, according to F. Katschinsky, from gelatin 1 gram, glycerin 96 grams, starch 144 grams, and a sufficient quantity of water.—*Phar. Zeitschr. Russl.*, 1881, No. 35.

Examination of Unguentum Hydrargyri.—Instead of removing the fat by means of benzin, ether or chloroform, C. Thein proposes the following process: 6 grams of the ointment are placed upon the bottom of a rather narrow test tube; 2 or 3 grams of magnesium sulphate or other neutral salt are added with enough distilled water to nearly fill the test tube, and the whole is heated until the fat which rises to the surface has become clear. The liquids are now allowed to cool, a splinter of wood being inserted in the fat, by means of which the latter after it has solidified may be easily lifted out of the test tube after slightly warming it. The fat is then weighed, and the mercury which has settled to the bottom may likewise be weighed after washing it with a little ether or chloroform to remove the last traces of fat retained by the metal.—*Phar. Ztg.*, No. 21.

Stability of Calomel.—Woellmer has examined powders and pills, kept for a period of thirty months, in the dark, in diffused daylight, in dry and in a damp atmosphere. The calomel was combined with sugar, both pure and whitened with ultramarine, with milksugar, gum arabic, aloes, liquorice root, and marshmallow root. Neither the formation of corrosive sublimate nor of ammonio chloride of mercury could be observed. For the solution of the former, sulphuretted hydrogen was employed as the chief test. The absence of ammoniated mercury was proven by treating the insoluble portion with dilute nitric acid, and testing the filtrate with silver nitrate. Decomposition was likewise not observed in a mixture of golden sulphuret of antimony, calomel and sugar.—*Ibid.*

Impure Yellow Oxide of Mercury.—C. Bernbeck has examined a commercial precipitated mercuric oxide which contained 7 per cent. of calomel. It was completely volatilized by heat, but on treatment with hydrochloric or nitric acid left a white insoluble residue consisting of mercurous chloride.—*Phar. Ztg.*, 1882, p. 32.

Impure Carbolic Acid.—Carbolic acid being now frequently met with in commerce in metallic vessels, H. Athenstaedt examined a sample by passing sulphuretted hydrogen into the aqueous solution,

obtaining at once a dark coloration and after some time a dirty white precipitate. On emptying the vessel, the bottom on the inside appeared rough as if corroded, and the solder was similarly affected in several places.—*Ibid.* p. 147.

Extractum Absinthii.—E. Claassen has found perfectly transparent yellowish crystals, which proved to be potassium chloride, in the extract of Artemisia Absinthium, *Lin.* The crystals were of great regularity of form and were combinations of the cube and octahedron, in some of them with a predominance of one of the forms.—*Amer. Jour. of Science*, April, 1882, p. 323.

Pepsin in Seasickness.—In a number of cases pepsin has proved effectual for the prevention of seasickness in passengers who had not made a seavoyage before. When the first symptoms appeared, pepsin, sufficient to cover the point of a knife, was taken, followed by a glass of water acidulated with 5 drops of hydrochloric acid. The dose was repeated several times a day, more especially before and after meals. The favorable results obtained invite to further trials.—*Phar. Ztg.*, 1882, No. 20; *Ind. Blätter.*

Artificial Hunyadi Yanos Mineral Water, which will be found to possess every advantage attributed to the natural water, is made by Prof. Charteris by dissolving magnesium sulphate 514·92 grains, sodium sulphate 519·54 grains, potassium sulphate 2·76 grains, sodium chloride 39·15 grains, and sodium bicarbonate 15·60 grains, in water 16 ounces. Dose, 2 ounces and upwards. A product made by following Liebig's analysis was found to be too weak and did not produce purgative action.—*Phar. Jour. and Trans.*, Feb. 25, p. 703; from *Lancet.*

Preparation of Hydrochloric Acid.—On heating a mixture of calcium chloride and magnesium sulphate in the presence of water, basic calcium-magnesium sulphate and free hydrochloric acid are formed: $CaCl_2+MgSO_4=(MgO,CaSO_4)+2HCl$. G. Eschellmann employs this process for the preparation of a pure hydrochloric acid, by heating a soft mixture of calcium chloride and Epsom salt or kieserite with water to dull redness. Magnesium chloride and calcium sulphate give the same result. The basic salt can be used in the manufacture of soda for the liberation of ammonia from sal ammoniac, magnesium chloride and calcium sulphate being formed, from which mixture on evaporation and heating hydrochloric acid is produced.

Treated in the above manner, a mixture of chloride and sulphate of

magnesium yields hydrochloric acid and basic magnesium sulphate ($MgO,MgSO_4$), the latter of which may be employed for the preparation of magnesia by boiling with water, Epsom salt remaining in solution.—*Chem. Ztg.*, 1882, No. 13.

PHARMACEUTICAL NOTES.

By R. F. Fairthorne, Ph.G.

Manna as an Excipient for Pills.—Certain substances are with difficulty made into pills that will retain the spherical form. Amongst others may be named reduced iron, subnitrate and subcarbonate of bismuth, oxalate of cerium, calomel, bicarbonate of sodium, tannin, extract of logwood, Dover's powder, acetate of lead, sulphate of zinc, chlorate of potassium, phosphate of iron, ammonio-ferric alum, lactate of iron, citrate of iron and ammonium, aloes, and sulphite of sodium. After these have been made up into pills with any of the ordinary excipients of a soluble character, they almost always flatten and often unite together in a mass that is both unsightly and the cause of much inconvenience. This difficulty can be overcome by using manna and syrup in variable proportions, according to the substance operated on. The quantity of manna required is from 25 to 33 per cent. of weight of the article to be made into pills. Thus, if 100 grains of reduced iron are to be made into 50 pills, 25 grains of manna will be required, together with sufficient syrup to make a mass. The quantity of the syrup must be carefully adjusted, so as not to have more than enough to produce a mass of the proper pilular consistence. When this precaution is taken, no difficulty will be experienced in making pills which will retain their proper form. Manna possesses certain advantages over other excipients that render it of value in the instances named; one is its hardness and another its solubility. It is certainly preferable to powdered tragacanth or rice flour, which are frequently used to give consistence to the pilular mass. I would suggest the use of manna in making Vallet's mass, substituting it for both sugar and honey. The mass would be more easily handled and firmer than that as usually met with.

When manna is used in making pills with the substances named it is best to place it in the mortar first and soften it with a few drops of syrup, and add the medicinal ingredients to it.

Elixir of Blackberry.—As summer approaches preparations of an astringent character are frequently called for, and as many of them are unpleasant to take, I offer the following receipt as one that possesses the former quality without the disadvantage of the latter:

Take of Fluid extract of blackberry,	f℥ivss
Syrup of blackberry fruit,	f℥xv
Jamaica spirit,	f℥xii
Curaçoa cordial,	
Cinnamon water	each f℥iv
Syrup of orange peel,	f℥iii
Oil of cloves,	
Oil of allspice,	each 12 drops

Mix the essential oils with the fluid extract of blackberry, add the Jamaica rum, and afterwards the other ingredients.

Elixir of Logwood is another preparation of a similar character:

Take of Extract of logwood,	10 dr., 2 scr.
Brandy,	12 fluidounces
Curaçoa,	6 fluidounces
Syrup,	6 fluidounces
Oil of nutmeg,	
Oil of cinnamon,	each 4 drops
Warm water sufficient to make 2 pints.	

Dissolve the extract in the water, add the other ingredients, and, when cool, filter.

Glycerol of Myrrh and Borax.—This preparation commends itself for many purposes, and will be found especially serviceable as an addition to gargles and toothwashes and as an application to sore nipples. It is made by the annexed formula:

Take of Myrrh (in coarse powder),	1 ounce
Powdered borax,	1½ ounce
Glycerin,	
Water,	each 3 fluidounces

Mix the borax and myrrh together, add the other ingredients, and boil in a flask for ten minutes; strain through muslin, and add enough water to make the mixture measure 6 fluidounces; when cold, filter through cotton or paper.

Solution of a considerable amount of the myrrh is effected by the borax, and the addition of glycerin enables a larger quantity of the borate of sodium to be dissolved than in water alone, producing a solution that is miscible with water without precipitation taking place.

This makes an elegant *lotion* for application to the gums, or as a

mouth-wash when diluted with decoction of quillaia bark and flavored with oil of rose or other essential oil.

The following is a very satisfactory formula:

Take of	Glycerol of myrrh and borax,	f℥ii
	Decoction of quillaia (2 ozs. to Oi),	f℥iv
	Oil of rose,	4 drops
	Oil of cloves,	6 drops
	Oil of orange peel,	6 drops

Mix and filter.

A Good Black Ink can be made with the following ingredients:

℞	Galls (in moderately fine powder),	2 pounds avd.
	Copperas,	10½ ounces
	Gum arabic,	10 ounces
	Sugar,	½ ounce

Water sufficient to make 18 pints.

Place the galls in an enameled vessel, pour on it 6 pints boiling water, and allow it to macerate two days; transfer to a glass percolator, in the neck of which is a piece of absorbent cotton, through which allow the liquid portion to drain. When this is accomplished, pack the galls firmly and displace with sufficient water to produce two gallons with that portion of the infusion which first passed. Then dissolve the gum and sugar in 2 pints of water; add this and the copperas to the infusion of galls. This, after standing about twelve days, will produce a very superior ink. About 8 drops of wood creasote should be added to prevent moulding.

SOME REMARKS UPON MODERN PHARMACEUTICAL STUDY.

By H. J. Möller.

If one, after having passed the famous old Quartier Latin, on the left bank of the Seine, stands before the northwestern entrance of the Jardin des Plantes, he may see on the left hand, on the corner of the Rue Linné and the Rue Cuvier, a monumental fountain, erected to the memory of the great zoologist, Georges Cuvier. The female figure which forms the centre of the monument holds in her left hand a tablet bearing the inscription, "Rerum cognoscere causas." A more suitable inscription could hardly have been found for a monument to the great *savant*, who in such a brilliant way showed us the importance of the *comparative studies*.

If one wishes to have a clear view of the present state of pharmaceutical study, and so to be able to choose that education which is the most suitable for his own country, it is necessary to make a *comparison* of the various

systems which are now used in the different countries. What I found of such information in the historical works[1] on pharmacy was all antiquated, and I commenced for myself to gather the following facts from, as I may say, all the corners of Europe.

Having been already nearly one year and a half on an educational tour on the Continent, I have particularly frequented the pharmaceutical institute of the University of Strassburg (Professor Flückiger) and the large School of Pharmacy in Paris (Professor Planchon and Mr. Gérard), have also visited a great many other pharmaceutical schools, and in that way have had the opportunity of seeing a good deal of the present pharmaceutical education. I have also enlarged my own sources of information through a rather extensive correspondence with several of the most eminent pharmacists and pharmaceutical professors, in Europe. All this information I embodied in a pamphlet,[2] which I published some weeks ago in Copenhagen, and had the honor of presenting to T. Greenish, Esq., F.C.S., President of the Pharmaceutical Society of Great Britain, and it is according to his friendly advice that I present to this journal that part of my pamphlet which, perhaps, may be of some interest for English pharmacists. In the Danish edition these remarks are accompanied by a plan for a complete reform of the Danish pharmaceutical study; here I have only briefly communicated, without criticism, the plans for pharmaceutical education which are adopted in the different countries.[3]

I am highly indebted to Mr. Th. Greenish, to whom I return many thanks, for the kindness with which he has given me great and valuable assistance by publishing the following essay in this journal.

England, Scotland and Ireland.

Though English Pharmacy probably is very well known in the United States, the following notes are given, which I owe partly to the kindness of Th. Greenish, Esq., F.C.S., President of the "Pharmaceutical Society of Great Britain," and which are partly taken from the calendar of this Society, published every year.

In *England and Scotland* the government does not regulate pharmaceutical education, but has left it entirely to the care of the "Pharmaceutical Society of Great Britain," which was established in 1841. After the incorporation of the Society by Royal Charter in 1843, a by-law was passed requiring all persons, except those who were in business on their own account before the date of the Charter, to pass an examination prior to admission as a member of the Society. The subjects of examination were

[1] Particularly, Phillippe, "Histoire des Apothicaires," Paris, 1853, and Hermann Ludwig's augmented German revision of this work, Jena, 1858.

[2] H. J. Möller, "Nogle Bemœrkninger om den nuvœrende Pharm. Uddannelse," etc. Köbenhavn, 1881. [137 pages.]

[3] We are indebted to the author for a copy of his pamphlet, and for the resumé of the regulations relating to pharmaceutical qualifications in Great Britain and Ireland, with which we commence this review, and followed by those of the other countries, as published in the "Pharmaceutical Journal and Transactions," omitting the sketch of the pharmaceutical education in the United States as being a subject with which our readers are familiar.—Editor Amer. Jour. Phar.

to be—as they now are—Chemistry, Pharmacy, Materia Medica and Botany, with the practical manipulations of the laboratory and dispensary; also the modes of ascertaining the strength and purity of drugs, the tests and antidotes for poisons, the doses of ordinary medicines and an acquaintance with Latin, the language of prescriptions.

These qualifications were all made more imperative by the *Pharmacy Act* of 1854, by which it was fixed that every person who assumed the title of, or pretended to be, a "Pharmaceutical Chemist," or "Pharmaceutist" in Great Britain, or a member of the Pharmaceutical Society, must have passed an examination. A register must be kept of all such persons. The Act thus established a distinction between qualified and unqualified persons, giving titles which the public might recognize; but it did not otherwise interfere with the sale of drugs or dispensing of prescriptions, and it was not yet necessary that every apothecary should pass this examination, which still was a voluntary one. It remained for the legislature of 1868 to complete the work thus begun.

The *Pharmacy Act* of 1868 commences thus: "From and after the 31st day of December, 1868, it shall be unlawful for any person to sell or keep open shop for retailing, dispensing or compounding poisons, or to assume or use the title Chemist and Druggist, or Chemist, or Druggist, or Pharmacist, or Dispensing Chemist or Druggist, within the meaning of this Act, and be registered under this Act, and conform to such regulations as to the keeping, dispensing and selling of such poisons as may from time to time be prescribed by the Pharmaceutical Society with the consent of the Privy Council."

It will be at once seen that a new class is hereby added to the Register, *i. e.*, "Chemist and Druggist." The Registers are published annually, according to Act of Parliament. It is optional with both classes whether they become members of the Society or not.

The *Society* consists of three grades—Members, Associates and Registered Apprentices or Students. Members must have joined the Society before 1853, or have passed the "Major Examination," and thus have been registered as "Pharmaceutical Chemists." Associates must have passed the "Minor Examination." Registered Apprentices or Students are required to have passed the "First or Preliminary Examination."

Of these examinations the following is the order. The "*First or Preliminary Examination*" is held in thirty-eight cities in Great Britain "at twelve noon, on the first Tuesday in January, April, July and October in every year."

The examination is a *written* one and comprises:

Latin.—Translation into English of a paragraph from the first book of Cæsar [De Bello Gallico]; Latin grammar.

Arithmetic.—The first four rules—simple and compound; vulgar fractions and decimals; simple and compound proportion; a thorough knowledge of the British and metrical systems of weights and measures.

English.—Grammar and composition.

The "minor" and the "major" are held five to six times a year in London and Edinburgh by a special board of examiners.

The "Minor Examination" [for registration as "Chemist and Druggist" under the Pharmacy Act, 1868]. Candidates for this examination must have passed the "First or Preliminary Examination," and have attained the full age of twenty-one years. Each candidate must produce a certified declaration that for three years he has been registered and employed as an apprentice. The examination embraces: reading and translating of prescriptions and general knowledge of Posology, Practical Dispensing, Pharmacy, Materia Medica, Botany and Chemistry.

The "Major Examination" [for registration as "Pharmaceutical Chemist," under the Pharmacy Act, 1852]. Candidates for this examination must have passed the "Minor" at least three months previously. This "Major" comprises Materia Medica, Botany and Chemistry [also Qualitative Analysis].

In the year 1879, 2,296 candidates were announced; of these 76 passed the "Major," 331 the "Minor," and 753 the "First or Preliminary Examination;" nearly one-half of the candidates were thus rejected.

Great Britain has now a great number of pharmaceutical schools; the most important of these is still "The School of Pharmacy," 17 Bloomsbury Square, London. This school was established by the "Pharmaceutical Society" in 1841. Since 1873, however, the fees have been advanced so much that the Society has ceased to have any pecuniary interest in the school. The number of students in the London school is yet ordinarily only thirty to forty, and thus not nearly so great as for example in the "École Supérieure de Pharmacie de Paris" (about 600), or in the large "Colleges of Pharmacy" in the United States.

In "Apothecaries' Hall," in London, some pharmaceutical examinations are also held, but these have a more private character, and do not have the same legal power as those which are supervised by the great Pharmaceutical Society.

These rules are not all directly applicable to *Ireland*, which has its own laws. In 1791 a law was published which ordered the establishment of an "Apothecaries' Hall" in Dublin, and pharmaceutical examinations were held there also. This is now changed by the new "*Pharmacy Act* [*Ireland*], 1875," according to which the "Pharmaceutical Society of Ireland" was organized. This Society is constituted quite like the English one, and must hold all pharmaceutical examinations, which are nearly identical with the above-mentioned in England.

The weakest point in English pharmaceutical education is doubtless the "First or Preliminary Examination," which is evidently much less severe than the corresponding one in other European countries.

The system of two classes of pharmacists must in my opinion, also be regarded as not quite satisfactory. I believe it to be one of the principal reasons for the present high standing of German pharmacy that there all pharmacists are obliged to pass the "Major." It is true, that in France there are two classes of pharmacists who have passed the "Major," but one must remember that the difference between these two classes consists only in different requirements at the *preliminary* examination, while the *pharmaceutical* examinations are the same, and that both these French preliminary examinations are much higher than the English.

Germany.

The laws by which the existing form of pharmaceutical study in Germany has been established, are the "Bekanntmachung des Reichskanzlers vom 5 März 1875, betreffend die Prüfung der Apotheker" and the "Bekanntmachung des Reichskanzlers vom 18 Nov. 1875, betreffend die Prüfung der Apothekergehülfen."

The young man who wishes to be accepted as an apprentice ("Lehrling," in German) in pharmacy has first to prove that he has passed the examinations which are demanded for an "einjähriger Freiwilliger" in the army; but it is necessary that these examinations shall have been passed in a college where Latin is an obligatory branch of study. This corresponds with the English "First or Preliminary Examination," but must be regarded as much more severe; for it is necessary that the young man shall have been one year in the "Secunda," *i. e.*, the highest class but one in the German classical school, and this German examination is nearly equivalent to the Oxford and Cambridge Middle Class Examinations.

When these claims are fulfilled, the candidate must stay three years in a pharmacy; if he has passed "das Abiturienten-Examen" (*i. e.*, the final examination for the highest class in the classical school), he needs to remain only two years as an apprentice in the pharmacy. It must be mentioned here that there is a strong party among the German pharmacists, who wish that the government shall demand this "Abiturienten-Examen" as the basis for all pharmaceutical education.

When the candidate has finished his apprenticeship, he passes his first pharmaceutical examination, the "Gehülfenprüfung" (*i. e.*, examination for assistants), required after January 1, 1876, by the above-mentioned law of November 13, 1875. This examination is not passed in the universities, but before special boards of examiners which are found throughout all Germany, and which consist of two pharmacists and a physician. The "Gehülfenprüfung" is in three divisions and lasts two days.

1. *The written examination* consists of three questions in chemistry, in botany or materia medica, and in physics. The candidates are watched during the six hours which are accorded for the answering of these three questions, and no access to books is allowed.

2. *The practical examination* consists in: (*a*) reading, preparing and taxing three prescriptions; (*b*) preparing one "galenical" and one chemico-pharmaceutical preparation after the Pharmacopœa Germanica; (*c*) examining the purity of two of the chemical preparations of the Ph. Germ. With these practical tests the candidate must present his "Laborations-journal," which he has prepared during the three years of apprenticeship and which includes a short description of all the work he has done in the laboratory in the three years.

3. *The oral examination* consists in: (*a*) recognizing and determining several fresh or dried plants; (*b*) explaining the derivation, adulteration and pharmaceutical use of several drugs and chemical preparations and explaining their composition and preparation; (*c*) translating two articles of the Ph. Germ.; (*d*) knowing the elements of botany, pharmaceutical chemistry and physics. With this oral test the candidate must present

his "*herbarium vivum*," *i. e.*, an herbarium which is collected and arranged by himself during his apprenticeship.

This "Gehülfenprüfung" corresponds to the English "Minor Examination;" but the young man has not yet the permission to possess his own pharmacy: he can only be an assistant.

The candidate must now spend at least three years as an assistant ("Gehülfe") in a pharmacy, and after this stage ("Servirzeit") he may commence his studies for "*die pharmaceutische Staatsprüfung*" (also called "das Apothekerexamen," *i. e.*, the "Major Examination.") He is now obliged to attend the lectures and do practical work in the laboratories of the university. Having thus been at least one year and a half occupied only with his studies, he has the right to present himself for this examination, which can be passed in either of the twenty universities of Germany or in one of the three polytechnic schools of Brunswick (Collegium Carolinum), Stuttgart and Carlsruhe. This examination is demanded by the above-mentioned law of March 5, 1875, and consists of the following five parts:

1. *Preliminary* (*written*).—Three questions in botany or materia medica, in inorganic and organic chemistry.

2. *Pharmaceutical, technical.*—To make two "galenical" preparations and two chemico-pharmaceutical preparations.

3. *Analytical, chemical.*—(*a*) Qualitative and quantitative (gravimetric and volumetric) analyses; (*b*) toxicological research (qualitative and quantitative).

4. *Pharmaceutical scientific* (*oral*).—In botany, materia medica and pharmaceutical chemistry.

5. *Final* ("Schlussprüfung") is also a scientific oral examination and is held in botany, chemistry and materia medica by the professors of the university and in the laws of pharmacy by an apothecary.

Only after having passed this last examination has the German pharmacist permission to possess a pharmacy, but even then he cannot, as in France and England, establish himself without a privilege of the government.

On these short remarks, the English pharmacist will have a valuable commentary in the very interesting article, which has already been published in the Pharmaceutical Journal (Nov. 1, 1871), by Mr. Greenish.

Russia.

The following remarks upon pharmaceutical education in Russia, I have taken partly from a French essay[1] of Dr. C. Méhu, and partly from some communications which Mr. C. Frederking, pharmaceutical chemist in Riga, has been so kind as to send me in answer to my inquiries.

The pharmacists in Russia make their studies in the universities as in Germany. Professors in pharmacy are employed by the universities in Moscow, Kiew, Kasan, Charkow, Dorpat and Warsaw; in St. Petersburg the pharmacists study in the Medico-Chirurgical Academy. All the pharmaceutical examinations are passed at these establishments. In general, the Russian pharmacy, through its whole development resembles the

[1] Journal de Pharmacie et de Chimie, 4 série, xx, pp. 60 and 139.

Scandinavian and German very greatly, and some of the most important Russian pharmaceutical journals are printed in German. A reform of pharmaceutical study in Russia may soon be expected, and if this reform is strictly and completely carried through, it will raise the Russian pharmacy to one of the highest development.

At present the following demands are required:

As in Germany, the candidate for apprenticeship needs to have attended the classical school ("das Gymnasium") before he commences his special education. At present it is only necessary to have passed the three lower classes of the "Gymnasium," but in the new plan for pharmaceutical study, which I shall mention later, it is proposed to require attendance upon six classes of the "Gymnasium," and this will perfectly correspond with the present demands in Germany. If the candidate has passed all the classes in the "Gymnasium" he can, as in Germany, finish his practical education in two years; if not, three to five years' apprenticeship is demanded.

The first pharmaceutical examination, the "Gehülfenprüfung," seems to be nearly the same as the above-mentioned corresponding German examination (the English "Minor"), only this one in Russia is passed before the pharmaceutical professors of the universities and not, as in Germany, before special boards of examiners.

After the "Minor" the candidate must spend three years in a pharmacy as an assistant. (After the year 1881 he can pass his three years as an assistant *after* the "Major"). Now he can commence his studies at the universities. After having occupied himself exclusively with these studies for *at least* three semestres (*i. e.*, one year and a half), and ordinarily for four semestres, he may pass the Russian "Major," "das Provisor-Examen." This embraces oral examinations in mineralogy, chemistry (also special pharmaceutical and toxicological chemistry), zoology, physics and materia medica. These examinations are held by the professors of the universities. The candidate must be able to give the first help to sick and wounded persons. At the practical examination he must recognize and describe two pharmaceutical drugs and two chemical products from their external characters, and make a qualitative and a quantitative analysis of one of those substances; he must also make a forensic analysis and write a report upon this research, must make two chemical preparations under the control of one of the professors, and prove that he possesses the knowledge of bookkeeping, necessary for a pharmacy.

In order to obtain the highest degree, "*Magister Pharmaciæ*," it is demanded: (1) that the candidate shall have been a "Provisor" for one year at least; (2) more severe examinations in the same sciences as in the "Provisor-Examen;" (3) the defence of a dissertation with at least six theses.

These are the present demands for pharmaceutical study in Russia. This country, possessing some of the most famous pharmaceutists of the present day,—I shall here only mention the names Dragendorff and v. Trapp,—has not been satisfied with the above plan, and in the beginning of 1880 the new project, which I have already mentioned, was published.[1]

[1] "Pharm. Zeitschr. f. Russland," 1880, No. 1. [Also in "Pharm. Zeitung," 1880, No. 14.]

According to this *new plan* the obligatory preparatory instruction will be raised from three to six classes in the classical school, and the apprenticeship fixed at two and a half to three years. (If the candidate has passed all the seven classes in the classical school, he can make his first pharmaceutical examination after an apprenticeship of two years.) This first pharmaceutical examination is held in the universities and called "ein pharmaceutisches Controll-Examen" (corresponding to the "Minor"). He has then the right to be an assistant in a pharmacy, and can immediately commence his studies at the universities. After having during *at least* two years followed the lectures and the laboratory work, he may pass "*das pharmaceutisches Candidaten-Examen*" (the "Major"), and will now have the title of "Candidat der Pharmacie" (formerly "Provisor") and the right to manage a pharmacy.

Beyond this there is a higher examination which is called "*das pharmaceutische Magister-Examen*," and corresponds nearly to the old examination of the same name which I mentioned above. This can only be passed when the aspirant has been a "Candidat der Pharmacie" at least two years.

The highest degree in pharmacy will hereafter be the "*Magister und Doctor der Pharmacie;*" this new examination can be passed by the candidate who has been a "Magister" in pharmacy for at least two years, and this test must be regarded as a very severe one; the candidate is obliged to defend another dissertation, more difficult than that for the "Magister-Examen."

The number of pharmacists in Russia is limited, as in Germany, Denmark, Norway, Sweden, etc. The "*Candidat der Pharmacie*," after having arrived at the age of twenty-five, has the right to manage or possess a pharmacy. The "*Magister der Pharmacie*" is preferred in the distribution of new "privileges" for pharmacies, and of the higher pharmaceutical offices; he can also be a lecturer or a "Professor extraordinarius" in the pharmaceutical chairs of the university. The "Doctor der Pharmacie" may become a "Professor ordinarius" in the pharmaceutical chairs of the universities, and has the precedence in appointment to the highest pharmaceutical government offices.

Denmark.

This country had very early an organized pharmacy. As early as December 4, 1672, it was fixed by law that every pharmacist should be examined by the College of Physicians, and by the pharmacists in Copenhagen. June 2, 1828, some new rules were given for pharmaceutical examinations. Since that time nearly all has been unchanged, and the proportionally high position which the Danish pharmacy held a hundred years ago has gradually been lost, and the standard of pharmaceutical study in Denmark (and that in Norway, which country until 1814 belonged to Denmark) must be regarded as at the present lower than in Germany. It is true that pharmaceutical study in Denmark has advanced in the last hundred years, but not nearly so much as in Germany, and the reason of

this proportional slowness of development must be found in the want of a special pharmaceutical school or institute, and in the predominance of physicians in the mutual administration of medicine and pharmacy. It is to be hoped that these two great wants will be removed in the near future and Danish pharmacy be as well situated as now in England, and so possess the most important conditions for its wider development.

The present state of pharmaceutical study in Denmark resembles that in Germany, and it is arranged in the following way:

After having passed his "Præliminair Examen" ("Preliminary Examination") and a special test in Latin, and having also finished his practical course, the young man passes his "Medhjœlperpröve" (the "Minor.") He is now a "Medhjœlper" (assistant) and can immediately begin to follow the lectures at the university in Copenhagen, at the same time he is occupied in the chemical laboratory of the university, and can after the lapse of two or three semesters, pass his last examination. He is now called a "Candidatus pharmaciæ," and has, as the "Apotheker" in Germany, the right to compete at the distribution of vacant or new "privileges" of pharmacies, or he can buy one of the pharmacies which were established before 1842, these pharmacies being the only ones which can be sold. All those which are founded after 1842 are a sort of government offices, which can only be vacant in case of death.

During the last year a powerful agitation has commenced for the purpose of obtaining more severe rules, and other improvements in the pharmaceutical studies, and without doubt a change for the better will be made in the near future.

NORWAY.

I owe the following information respecting pharmaceutical study in Norway to my friend Morten Nyegaard, Esq., of Christiania, Editor of "Farmaceutisk Tidskrift," the Norwegian pharmaceutical journal. These remarks are mainly taken from a collection of the Norwegian pharmaceutical laws,[1] which Mr. M. Nyegaard published some few years ago.

Norway was connected with Denmark until 1814, and therefore it is quite natural that the rules for Norwegian pharmaceutical education should much resemble the corresponding ones in Denmark.

After having passed a preliminary examination (including a special test in Latin), and having finished his practical education in pharmacy, the young man passes his "Medhjœlperpröve" ("Minor") before a government medical officer. He is now allowed to be an assistant and called "Studiosus pharmaciæ." As in Denmark this "Medhjœlperpröve" must be regarded as a little less severe than the above-mentioned German "Gehülfenprüfung" ("Minor"). Thereafter he can immediately commence his studies at the university in Christiania, and afterwards pass the "Apotheker Examen," also called "den pharmaceutiske Examen" ("Major") which is clearly defined by the law of May 10, 1860. Besides the branches of science belonging to the German "Major," this examination includes zoology, mineralogy, and knowledge of the pharmaceutical drug

[1] M. Nyegaard: "Looe vedkommende det norske Apothekervœsen," etc. . . . Christiania, 1878.

trade (including also the rules for bill-brokerage, exchange and book-keeping by single entry, and knowledge of the laws which relate to pharmacy). Still the requirements in chemical analysis are not nearly so severe as in the corresponding German course. Having passed this last examination, the young man has the title of "Examinatus pharmaciæ," and can now manage or possess a pharmacy.

In the spring of the year 1881, the Norwegian government published a new plan for pharmaceutical study, and this is at present the subject of a lively debate. The most important improvements proposed are the following: The "Minor" shall be held only in Christiania, Trondhjem and Bergen, twice a year, and not, as formerly, by a government medical officer alone, but by special boards of examiners, consisting of two pharmacists and a physician; one of the two pharmacists to be the president of the board. At this examination the student must, as in Germany, present an herbarium, which he has collected and arranged himself. Between the "Minor" and the "Major," he must spend at least two years as an assistant in a pharmacy. The requirements for the "Major" are nearly the same in the new plan as in the old, but the government proposes the establishment of a special pharmaceutical institute in Christiania; the lectures for pharmaceutical students are to be held partly at this institute, partly at the university.

Sweden.

These remarks I have taken partly from a Swedish essay[1] of Mr. M. Holsti, and have partly obtained by correspondence with Professor R. F. Fristedt in Upsala, and Professor N. P. Hamberg in Stockholm, the latter of whom, until a few years ago, was director of the Pharmaceutical Institute in Stockholm. I am highly indebted to these two gentlemen for the kindness with which they have answered all my inquiries.

According to a law of December 19, 1879, a "First or Preliminary Examination" and a special test in Latin must be passed before the student enters the pharmacy. This examination must be regarded as higher than the corresponding one in Denmark and Norway, and is nearly the same as that now demanded in Germany. The apprenticeship is fixed at at least three years. After this he passes the "Minor," which is here called "farmaciestudiosi-examen," or "farmaciekandidat-examen." After 1881, this examination can be passed at "farmaceutiska institut" in Stockholm only. The requirements for the "Minor" are nearly the same as in Germany. The student must, as in Germany, present his "Laborations-journal" at this examination.

He must now stay a year in a pharmacy as an assistant, and then he may go to Stockholm and enter the pharmaceutical institute. Having studied here for at least two years, he passes his "Major" ("Apotekare-examen") which is more severe than the Danish and Norwegian "Major," and is nearly the same as the corresponding German examination. This examination is fixed by a law of February 25, 1867, and having passed it the young man has the title of "Provisor och examinerad apotekare."

The pharmaceutical courses are thus somewhat higher in Sweden than

[1] "Finska läkaresällskapets handlingar." Adertonde bandet No. 1.—Helsingfors, 1876.

in the two other Scandinavian countries, and I suppose this fact especially is owing to the pharmaceutical institute in Stockholm, which has been active since 1837, while Denmark and Norway until this date lack such establishments.

AUSTRIA.

The following information respecting pharmaceutical study in Austria, I have partly collected myself while on a journey in that country (1879), and partly have obtained later from my friend Mr. P. Stolzissi, pharmaceutical chemist in Wailenkirchen, Ober-Oesterreich.

It is demanded by a law of June 14, 1859, that, as a "Preliminary examination," the candidate shall have passed "das Untergymnasium," *i. e.*, shall have attended the classical school for four years, and thus shall have learned Latin and Greek. After having been an apprentice ("Tyro," "Tiro," "Lehrling," or "Praktikant") for at least three years, he passes his "Minor" before the board of the "Gremium" of the province. The "Gremium" is a union of the pharmacists in the province, and of these "Apothekergremien" Austria possesses thirty-three. (Bavaria has also "Apothekergremien.")

The Austrian "Minor" is called "*Tyrocinialprüfung*" and corresponds very nearly to the German "Minor."

Having passed this examination, the young man is an assistant and must serve as such for two years in a pharmacy. Then he may commence his studies for the "Major" ("*die pharmaceutische Staatsprüfung*"). These studies are carried on at the universities for two years, on the following plan:

The first year; (1) Winter-semester: Physics, Mineralogy, Inorganic and Organic Chemistry—in each branch five hours of lectures a week. (2) Summer-semester: Zoology and Botany, each eight hours a week, Inorganic and Organic Chemistry, five hours a week. Then the examinations in Physics, Mineralogy, Zoology and Botany are held.

The second year: Pharmaceutical Chemistry, five hours a week, Materia Medica, three hours a week. Practical exercises in the chemical laboratory at least ten hours a week (qualitative, quantitative and forensic analyses). At the end of this year are first held the practical examinations (called "Magisteria,") and afterwards the theoretical examinations ("die Rigorosen") in Chemistry, Materia Medica and the pharmaceutical laws. At last he takes the pharmaceutical oath, and is now called "Magister der Pharmacie." Now, at length, he has the right to possess or manage a pharmacy.

If he wishes to be a "Doctor der Pharmacie," he must present "das Maturitätszeugniss," *i. e.*, a certificate that he has passed all the eight classes in the "Gymnasium," and that he has studied chemistry for a year after he has passed the "Major."

Want of space does not permit me to make these remarks so complete as I could have wished, but further information may be found in the very interesting essay of Mr. Th. Greenish, F.C.S., in Phar. Jour. and Trans. for May 4, 1872.

(To be continued.)

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, May 16, 1882.

The regular pharmaceutical meeting was held in the College hall, Alonzo Robbins in the chair, and William McIntyre acting Registrar.

Prof. Maisch, on behalf of the American Pharmaceutical Association, donated Vol. 29, Proceedings of their annual Meeting, 1881.

James T. Shinn read a paper prepared by A. H. Riise, of St. Thomas, W. I., on Bay Rum, and donated specimens of the leaves and fruit of Myrcia acris, oil of bay and distilled bay rum (see page 278). In the discussion on this paper this subject was said to be of importance from the little that had been published. Bay rum is hardly known on the continent of Europe, and 25 years ago its true origin was also unknown in this country. In a paper published in the "American Journal of Pharmacy," in 1861 (page 289), it was shown that bay rum was produced from Myrcia acris, the material for identifying the plant being a few leaves and branchlets, without flowers and fruit. Subsequently, the late Mr. Elias Durand ascertained, through one of his West Indian correspondents, that the plant had been correctly determined, but nothing was then known of the use of the fruit in this connection. That the volatile oil of this plant contained eugenol was known for some years, but this was first published by Prof. Markoe in 1877, who had made many interesting experiments with the volatile oil distilled by himself from the leaves, which proved its close chemical relation to the volatile oils of clove and pimenta. The composition accounts for the resemblance in odor; still there is a marked difference in this respect, fully as great as, for instanc, in those volatile oils which contain anisol, and the cause of this difference is as yet not known. Plants which are of near botanical relation are often of very similar chemical composition; yet in the volatile oils there is sometimes a wide difference, not merely in odor but in their constituents. Attention was drawn to the collection of volatile oils of different species of Eucalyptus which some years ago were presented to the College cabinet by Mr. Bosisto, of Melbourne, and of which one, obtained from *Eucalyptus persicifolia*, possesses not only an odor closely analogous to, but contains also the same chemical compounds which are found in the volatile oil of bitter almonds. It was suggested by Prof. Maisch that probably the volatile oils of several of the many West Indian myrtles might contain eugenol and have a more or less distinct allspice odor, but that others had most likely an entirely different composition, and that the many varieties of the bayberry tree, referred to in the paper of Mr. Riise, were really different species of the genera Pimenta, Myrcia and other Myrtaceæ.

Mr. Shinn showed four samples of commercial bay rum, of which the one made by Mr. Riise had the specific gravity ·9210, corresponding to 48½ per cent. by weight of alcohol, while the density of the others was ·9290, ·9325 and ·9380, equal to 44½, 43 and 40½ per cent. of alcohol. A specimen

of St. Croix rum had the specific gravity ·930 = 44 per cent. alcohol. The fragrance of these and similar spirits may be compared by first filling a clean test tube or small vial and then emptying it, after which the peculiar flavor and its permanence become more apparent.

A vote of thanks to Mr. A. H. Riise was passed, and the paper referred to the Publication Committee.

Dr. L. Wolff read a paper on *chlorinated oil* (see page 273), illustrated the chemical nature of the substitution compounds on the blackboard, and exhibited specimens of chlorinated oils, and of soap prepared from them. The thanks of the meeting were extended to Dr. Wolff, and the paper was referred to the Publication Committee.

During the discussion on this paper it was stated that commercial olive oil was frequently adulterated with cotton seed oil, and it was said that the latter was also mixed with lard oil, and that a reliable test for its presence was very desirable.

Dr. A. W. Miller spoke of a new and clumsy adulteration of *sassafras oil* with kerosene, detected by its odor and its insolubility in alcohol; a sample of the adulterated oil was exhibited.

Also a new *vermilion substitute*, free from mercury and of handsome appearance; it is said to be made from a fine specimen of orange mineral tinted with eosine.

On motion, the meeting adjourned.

WILLIAM MCINTYRE, *Registrar pro tem.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

CHICAGO COLLEGE OF PHARMACY.—The adjourned annual meeting was held in the Library of the College, May 2d. After the reading of the minutes of the semi-annual and of the special meetings of the College, President Bartlett read the annual address, in which he reviewed the work of the College for the past and made suggestions as to the future of the institution. Reports of the various standing committees were read—that of the Lecture Committee showing that the past session had been the most prosperous, the number of students having largely increased and the average proficiency having been unusually high.

The annual election was then held, in which the following officers were chosen: President, Prof. N. Gray Bartlett; Vice Presidents—Mr. George Buck and Prof. G. M. Hambright; Recording and Corresponding Secretary, Judson S. Jacobus; Treasurer, T. H. Patterson; Trustees—Messrs. H. Biroth, E. H. Sargent, Thos. Whitfield, J. H. Wilson, H. D. Garrison, J. C. Borcherdt, E. K. McPherson, F. H. Secord, R. H. Cowdry and J. L. T. Davison.

ST. LOUIS COLLEGE OF PHARMACY.—The Board of Trustees have re-elected the faculty of the last session: Dr. C. O. Curtman, chemistry;

Dr. O. A. Wall, materia medica and botany, and J. M. Good, Ph.G., pharmacy.

The Alabama State Pharmaceutical Association held its first annual meeting at the Gulf City Gun Club rooms, at Mobile, May 9th and 10th. Dr. Savage, in behalf of the Mobile County Pharmaceutical Society, extended a cordial welcome to the members and visitors. The annual address of President P. C. Candidus was replete with thoughtful suggestions and dwelt more especially upon the necessity of the enactment of a pharmacy law having in view the protection of the public against incompetent practitioners of pharmacy and against worthless and fraudulent medicines, and thereby elevating phsrmacy.

The draft of a pharmacy law was discussed and ordered to be presented to the Legislature at its next session.

The following officers were elected for the ensuing year: President, P. C. Candidus; Vice Presidents — J. T. Bradfield and J. B. Collier; Treasurer, Y. P. Newman; Secretary, S. W. Gillespie; Executive Committee— T. J. Savage, Mobile; E. P. Braun, Mobile; John L. Rison, Huntsville. Various committes were appointed, also delegates to the American Pharmaceutical Association, and the Association finally adjourned to meet next year in Selma, on the second Tuesday in May.

The Indiana State Pharmaceutical Association was organized at Indianapolis, May 9th, the meeting being held in Masonic Hall, about 250 druggists being present. Mr. W. C. Buntin, of Terre Haute, was elected temporary chairman and Jos. R. Perry, temporary secretary. A Committee on Permanent Organization was appointed and subsequently reported a constitution and by-laws, which were discussed, amended and adopted, followed by the election of the following officers: President, George H. Andrews, of Muncie; Vice Presidents—Flor. C. Schmidt, of Evansville and Charles V. Eyle, of Warsaw; Secretary, Jos R. Perry, of Indianapolis; Treasurer, Emil Martin, of Indianapolis; Executive Committee—Jacob Baur, Terre Haute; John M. Hurty, Indianapolis, and David Helt, Lafayette.

A paper, comparing the drug store of thirty years ago with that of to-day, was read by Mr. Geo. W. Sloan, various standing committees and delegates to the American Pharmaceutical Association were appointed, and the Association finally adjourned May 10th, to hold its next meeting again at Indianapolis, Mr. John Lambert being elected Local Secretary.

The Association was visited and addressed by Hon. D. W. Grubbs, Mayor of Indianapolis, and Governor A. G. Porter, of Indiana.

The Louisiana State Pharmaceutical Association was organized by a convention of pharmacists and druggists which assembled at the

rooms of the Louisiana Medical Association in the University of Louisiana, in New Orleans, on Monday, April 24th. The meeting was called to order by Mr. F. Brooks, of Baton Rouge; Mr. J. T. Thibodeaux was elected President pro tempore and Hiland Flowers, of New Orleans, Secretary pro tempore. A committee, consisting of Messrs. F. M. Brooks, C. L. Keppler, A. K. Finlay, B. Lewis and S. Hiriart, was appointed to draft a constitution and by-laws, which were subsequently considered, somewhat amended and adopted. The following permanent officers were then elected: President, Dr. Jos. T. Thibodeaux; Vice Presidents—Alex. K. Finlay and Dr. F. M. Brooks; Recording Secretary, Hiland Flowers; Corresponding Secretary, Ben. Lewis; Treasurer, Jno. B. Lavigne.

Several telegrams and communications, commendatory of the objects of the new association, were received and read. About sixty members were present at the opening session, and about forty more were subsequently elected—among them Mrs. E Rudolf, who, it was stated, though refused admission into the Medical College of the University of Louisiana, had perfected herself through private instructions; she is, we believe, the first lady member of a State pharmaceutical association. Prof. P. W. Bedford, of New York, Prof. J. M. Maisch and Mr. Alonzo Robbins, of Philadelphia, were elected honorary members.

Various committees were appointed and the work to be done by them considered; among them was a committee on legislation, at whose suggestion a special meeting was called for Monday, May 15th, with the view of considering the draft of a pharmacy law to be presented to the Legislature at its meeting in the same month.

Invitations were extended to all physicians throughout the State to attend the meetings and have the privilege of the floor, and to the American Pharmaceutical Association for holding its meeting next year in New Orleans.

The President was called upon to interpret the words "every *pharmacist and druggist*, etc., shall be eligible to membership," as contained in Art. III of the Constitution, and decided that this referred to one person only; accordingly, as a pharmacist is a person that confines himself strictly to putting up prescriptions and dispensing drugs, and a druggist one who merely sells and handles them, a druggist, whether wholesale or retail, is not eligible for membership unless he possesses the qualification of being a pharmacist in addition.

After having been in session for three days, the Association adjourned. The next annual meeting will be held in New Orleans on the first Monday in April, 1883.

At the special meeting of May 15th, 45 members attended to consider the proposed pharmacy act reported by Mr. G. J. Mattingly in behalf of the Committee on Legislation. The various provisions were discussed seriatim and, after the acceptance of a few amendments, the report was adopted, ordered to be printed, and at once forwarded to each legislator at Baton Rouge. In the evening the members sat down to a complimentary dinner at Astredo's, at the West End, given in honor of the visiting members.

The Massachusetts Pharmaceutical Association was organized at Worcester, May 17th, about two hundred apothecaries having assembled in Horticultural Hall. Words of welcome were spoken by Mr. W. Bush, of the Worcester Pharmaceutical Association, and Mr. C. H. Price, President of the Middlesex County Pharmaceutical Association, was elected temporary chairman. A constitution and by-laws had been informally discussed the preceding evening and were now again considered, somewhat amended and adopted.

The following permanent officers were elected: President, S. A. D. Sheppard, of Boston; Vice Presidents—Wm. Bush, of Worcester, H. A. Estabrook, of Fitchburg, and F. T. Whiting, of Great Barrington; Permanent Secretary; J. W. Colcord, of Lynn; Treasurer, F. H. Butler, of Lowell. Standing committees on papers and queries, on trade, Executive Committee and Trustees on permanent fund, and delegates to the American and to the New York Pharmaceutical Association were elected. A committee of fifteen, representing different parts of the State, was appointed on the subject of legislation and instructed to advocate a stringent pharmacy law. To the same committee were referred the following preamble and resolution, offered by J. G. Forman, of Lynn:

"Whereas, Druggists and apothecaries are subject to much inconvenience and embarrassment in their legitimate business, under the existing license law, and in some towns and cities the heated contests of the extreme partisans of license and prohibition have resulted in the refusal to grant the sixth-class license to apothecaries, exposing them to the penalties of the law for sales as a medicine, even though made under the prescription of a physician;

"*Resolved*, That the Committee on Legislation be requested to represent this evil to the next Legislature of the Commonwealth, and to secure, if possible, the following amendment to the license law, as far as it relates to apothecaries: Chapter 100, section 2, amend so as to read 'Druggists and apothecaries may sell pure alcohol for medicinal, mechanical and chemical purposes; also, wines and other spirituous liquors when prescribed by a physician; they may also sell liquors of any kind, not to be drank on the premises, under a license of the fourth or sixth class hereinafter mentioned: *Provided, however*, That druggists shall not be subjected to the penalties for unlawful selling when the sale is made upon the prescription of a physician.'"

A resolution was offered by Mr. Canning, of Boston, declaring it as the sense of the Association that the wholesale dealers in drugs and patent medicines should take measures to protect the pharmacists by not selling to any except regular pharmacists.

The following papers were read during the meeting:

On the Pharmacopœia, by Mr. S. A. D. Sheppard, giving its history, commencing with the local pharmacopœia published in 1805 by the Massachusetts Medical Society, and its commentary, the dispensatory, by Dr. Jas. Thacher, of Plymouth, and following up the elaboration of the United States Pharmacopœia in 1820, and its various revisions to the present time, and referring to the influence upon these revisions by Drs. Wood and Bache, the authors of the United States Dispensatory.

On Alkaloids, by Prof. P. W. Bedford, describing their sources and processes of manufacture.

On Pepsin, by Mr. W. W. Bartlett, describing its mode of manufacture, the apparatus used and methods of assay.

By Mr. H. A. Estabrook, of Fitchburg, *On Fluid Extracts and Other Preparations*, made with the Rosenwasser percolator (see "Amer. Jour. Phar.," 1881, p. 567), with suggested improvements, illustrated with a glass model of a percolator. The process utilizes hydrostatic pressure and can be applied to rapid filtration.

On the Metric System of Weights and Measures, by Prof. G. F. H. Markoe, explaining its origin and relations, and illustrated by weights and apparatus.

During the meeting courtesies were exchanged, by telegraph, with the State pharmaceutical associations then in session, and the Association adjourned to hold its next annual meeting at Springfield on the third Tuesday of May, 1883, when, at the suggestion of the President, the members will be accompanied by ladies, so as to make the meeting a season of pleasure as well as profit.

THE NEW JERSEY PHARMACEUTICAL ASSOCIATION held its twelfth annual meeting in the City Hall at Atlantic City, May 17th and 18th, President Charles Holzhauer in the chair; A. P. Brown, Secretary. Addresses of welcome were made by Dr. W. Wright, Mayor of Atlantic City, and by Dr. Reed. In his annual address, the president made various timely suggestions, which were subsequently considered. The Treasurer reported a balance of $342.87 on hand, an increase of $73 over the preceding year's report. Reports were also read from the State Board of Pharmacy, showing the work done during the preceding year and the amount of money received, which was $369, and $38.50 in excess of the expenditures, the excess being paid over to the Association in conformity with the pharmacy law. The report also related the favorable result of a suit for enforcing this law, and the by-laws were subsequently modified, so as to render ineligible as members of the Association all those who have not complied with the pharmacy law.

A communication from a committee of the Pennsylvania Pharmaceutical Association, relative to the liquor license of pharmacists, was read and the resolution (see page 261) adopted and forwarded to Congress.

The following-named officers were elected for the ensuing year: President, Joseph P. Canby, Atlantic City; Vice Presidents—Joseph Bassett, Salem, and D. Wood Brant, Newark; Treasurer, William Rust, New Brunswick; Recording Secretary, A. P. Brown, Camden; Corresponding Secretary, R. W. Vandervoort, Newark; Standing Committee—Joseph Bassett, Thomas Combs, H. C. Thorn, Charles Holzhauer and Robert J. Shaw.

Obituary notices of members deceased during the past year were read and a picture of the late Charles H. Dalrymple was ordered to be procured. Professor J. P. Remington was elected an honorary member.

A resolution of sympathy was adopted with Mr. E. S. Reed, of Atlantic City, who had zealously worked for making this meeting a success, and was now prostrated by sickness.

Greetings by telegraph were received from several pharmaceutical associations in session, and were appropriately answered.

The following papers were read and referred for publication:

On the Ownership of Prescriptions. By Chas. B. Smith. The author maintained that the renewal of prescriptions could only be prevented by the physician informing the patient and making the written statement upon the prescription that it was to be compounded once only.

On Tincture of Capsicum. By G. W. Parisen. A stronger alcoholic menstruum than that ordered by the present Pharmacopœia was recommended.

On New Drugs and Remedies. By F. W. Kilmer. An able review, frequently humorous, of the remedies introduced and revived during the past ten years.

On an Excipient for Pill Masses. By G. W. Parisen. Glycerite of starch was recommended as a very useful one.

On Text Books and a Course of Instruction for Beginners. By H. P. Reynolds. While the well-known text-books were recommended, the author insisted on the personal instruction of the apprentice by the employer as a duty.

On the Use of the Microscope in Pharmacy. By A. P. Brown. The author showed the usefulness of the microscope in the examination of drugs for their identity and purity, and in the analysis of urine and other matters.

On the Condition of Pharmacy. By D. W. Brant. Various matters of general and local interest were discussed by the author.

The subject of a suitable *substitute for vaselin* and similar *soft paraffins* was discussed by Chas. Holzhauer, who found a mixture of good paraffin oil with wax answering the purpose.

The question concerning the *use of specialties* manufactured on the large scale created considerable discussion, it being maintained on the one side that the prescribing of such pharmaceutical novelties of manufacturers by physicians was improper; that it was the duty of the pharmacist to prepare the pharmacopœial galenicals, to cultivate his skill for compounding medicines in all possible forms, and to teach his apprentices and assistants in the same direction. On the other hand, representatives of manufacturers contended that at least some of these specialties could be made more accurately and handsomer by the use of machinery constructed for the purpose.

Resolutions were adopted favoring the abolition of stamp duties on matches, bank checks, medicines and perfumery.

The next annual meeting will be held at Orange, and Mr. G. J. Seabury was appointed Local Secretary.

On the evening of May 17th a microscopical exhibition was given at the Ocean House, and proved to be very attractive and interesting. An excursion was tendered by the Camden and Atlantic Railroad to the members

and visitors to South Atlantic City, where the curious structure of the Elephant Hotel formed the chief attraction, a building having the shape of a huge elephant, 86 feet long and 65 feet high, which has been erected there, on the beach, facing the Atlantic Ocean.

The Ohio State Pharmaceutical Association held its fourth annual meeting in Gold Hall, Zanesville, May 17th, President I. N. Reed in the chair; L. C. Hopp, Secretary. Dr. D. C. Peters addressed words of welcome to the visitors, and various invitations from manufacturers were received to visit their establishments. A delegation from the Pennsylva- Pharmaceutical Association was present and presented the action had in regard to the liquor dealers' license (see page 261). After a lengthy discussion, a resolution was adopted favoring the proposed plan and ordering its being communicated to the representatives of Ohio in Congress.

In his annual address, the President alluded to many subjects of local and general interest, taking a decided stand against patent medicines and trade mark compounds, concluding his remarks on this subject with the statement that the removal of the stamp tax was not of interest to pharmacists financially, and with picturing the evil effects upon pharmacy and science in general, not the least of which is the endorsement by some chemists and physicians of no mean fame or intelligence of compounds which a trade mark or patent prohibit any but the owner from manufacturing. The pharmacist, he argued, may with propriety recommend, in fair terms, his own compounds, and, like Scheffer with his pepsin, freely give it to the scientific world, thus inlaying his action with the jewels of of love for his profession.

The reports of the Secretary, Treasurer and Executive Committee were read, all showing gratifying results. The salary of the Secretary was fixed at $100 per annum.

The election of officers for the ensuing year resulted as follows: President, Dr. D. C. Peters, Zanesville; Vice Presidents—E. A. Schellentraeyer, Cleveland, and F. Harrington, Logan; Permanent Secretary, L. C. Hopp, Cleveland; Permanent Treasurer, Chas. Huston, Columbus.

The various standing and several special committees were appointed, and delegates were elected to attend the meetings of the Pennsylvania and of the American Pharmaceutical Association. The membership was increased by 156 new members, and Dr. E. R. Squibb, Profs. E. S. Wayne and J. M. Maisch were elected honorary members. Akron was selected as the place for holding the next annual meeting, but the vote was subsequently reconsidered, on the ground that the hotel facilities were insufficient for accommodating the members, and Cleveland was selected.

Greetings were interchanged, by telegraph, with several State associations in session, and several papers were read, of which, however, the titles have not been received.

The fourth session, held on Thursday morning, May 18th, was mainly devoted to the consideration of a pharmacy bill, prepared by a committee, of which J. A. Nipgen, of Chillicothe, was chairman. The bill, which is almost identical with the Cincinnati pharmacy law, was amended so as to

apply to venders of drugs, chemicals, etc., for "medicinal purposes." Considerable discussion was had on the section making the officers and teachers of schools or colleges of pharmacy ineligible as members of the pharmaceutical examining board, and the association by a decided vote refused to strike out this clause. The bill will be presented to the Legislature next winter, with a petition for its passage, by a committee appointed for the purpose, and another committee was charged with making nominations for the pharmacy board in case the bill should become a law.

The association then adjourned.

THE VIRGINIA STATE PHARMACEUTICAL ASSOCIATION held its first annual meeting in the city of Richmond, in the hall of the House of Delegates, May 16th and 17th. Hon. W. C. Carrington, Mayor, welcomed the members in a brief but appropriate speech. President T. R. Baker delivered his annual address, making many valuable suggestions. Reports were received from the Secretary and from the Committee on Legislation, the latter stating that the effort to have a pharmacy law passed had failed. The bill was afterwards considered by sections, slightly amended, and endorsed for presentation to the Legislature at its next sessions.

Greetings, by telegraph, were exchanged with several State pharmaceutical associations then in session. Several amendments to the by-laws were proposed for consideration at the next meeting, a number of members were elected and various committees appointed. Papers were read by Mr. Thomas, of Norfolk, on "the toxic properties of potassium chlorate," and by Mr. Purcell on "the duties of an apothecary in the olden time (sixteenth century)." Norfolk was selected as the place for holding the next annual meeting.

After adjournment the Richmond pharmacists entertained the visiting members at a banquet, at Saenger-Halle.

PHARMACY LAW IN WEST VIRGINIA.—The law passed Feb. 21, 1881, has been amended and re-enacted, March 25, 1882, the State Board of Pharmacy being composed of one pharmacist from each Congressional district, namely, Edmund Bocking, of Wheeling, Secretary and Treasurer; J. L. W. Baker, of Martinsburg; E. L. Boggs, of Charleston, President, and A. N. Williams, of Parkersburg, Vice-President.

PHARMACY LAW IN WISCONSIN.—A pharmacy act was approved by the Governor March 24th, which entrusts the Wisconsin Pharmaceutical Association with nominating the candidates from whom the Governor appoints the State Board of Pharmacy. The first board is constituted as follows: T. H. Spence, of La Crosse, President; A. H. Hollister, of Madison; F. Robinson, of Kenosha; A. Conrath, of Milwaukee, and E. B. Heimstreet, of Janesville, Secretary.

THE ST. JOSEPH, MO., PHARMACEUTICAL ASSOCIATION was organized April 12th; a constitution and by-laws were adopted and the following officers chosen: President, Wm. Striblen; Vice-President, Thomas H.

Elfred; Secretary, Eugene Soper; Treasurer, Geo. E. Coulter. It is intended to hold meetings on the evenings of the first and third Tuesday of each month.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.—At the pharmaceutical meeting held March 1st, President Greenish in the chair, Mr. Holmes called attention to a soft Columbian bark, which Mr. Howard had informed him was likely to enter into commerce in large quantities, and which yielded 1·56 per cent. quinine sulphate, 1·55 cinchonidine sulphate, and 0·25 cinchonine. The bark was reddish, had a coarse fibre, and the leaves accompanying it were minutely wrinkled. The variety *oblonga* of *Cinchona lancifolia*, described by Howard in 1873, had a yellowish bark, less coarsely fibrous, and the leaves were smooth.

The bark of *Rauwolfia glabra* is used in Natal, under the name of *bitterboom*, as a substitute for cinchona in the treatment of fevers; and an aromatic bark called *capoche bark* is said to be produced from a scarce tree, and used in Belize for fevers, etc.

Mr. Martindale called attention to a test recently devised by Mr. Yvon for the *purity of chloroform*, and consisting in a strongly alkaline solution of potassium permanganate (1 part permanganate, 10 parts potassa and 250 parts water), which in contact with the chloroform should retain its violet color for ten minutes. Four samples prepared from methylated spirit, two from pure spirit, and one from chloral, would not stand this test; ether and alcohol, as well as other impurities, would cause a reduction, and prolonged action of the alkaline liquid upon chloroform would break it up into potassium formate and chloride. On purifying it with this test, the chloroform was free from disagreeable odor, and on evaporation left no amylic alcohol impurity.

Professor Redwood observed that at the time when the additions to the British Pharmacopœia were under consideration, Professor Christison had suggested that the cause of the change in chloroform was an impurity, probably nitric acid, in the oil of vitriol used in the purification. Prof. Redwood had satisfied himself that the presence of a very small quantity of nitric acid in the oil of vitriol used would, in a short space of time, produce decomposition; this fact seemed to have been recognized by manufacturers, and chloroform now supplied was less liable to change. He doubted the necessity of adding a little alcohol to the chloroform in order to preserve it. The importance of the subject could not be overestimated so far as regarded chloroform to be used for anæsthetic purposes.

A paper by Mr. J. C. Thresh was read on *the constituents of Zingiber officinale*, augmenting his investigations made in 1879 (see "Amer. Jour. Phar.," 1879, p. 519). The neutral resin has the empirical formula $C_{16}H_{24}O_3$, and is slowly acted upon by melted potassa, yielding most probably protocatechuic acid. The acid resins were separated by fractional precipitation with basic lead acetate. Resin α is hard, brittle, jet-black, has the composition $C_{46}H_{54}O_{10}$, yields amorphous compounds with bases, and on fusion with potassa an acid reacting with ferric chloride like protocatechuic acid. Resin β is red-brown, so soft as to be easily indented by

the nail, but breaks with a resinous fracture, and has probably the composition $C_{43}H_{58}O_8$. The straw-colored oil, having a slightly aromatic odor and a bitter, somewhat pungent taste, is probably a hydrocarbon polymeric with terpene. The active principle gingerol is so susceptible of change, by action of heat and the various substances employed in isolating it, that it is almost impossible as yet to feel assured of its purity.

A note on *extract of aconite and on the alkaloid of Aconitum paniculatum*, by E. L. Cleaver and M. W. Williams, corroborated the fact, previously stated by Mr. Holmes, that the plant mentioned is to a certain extent used for the preparation of extract. This extract is dark green, firm, of a slightly bitter taste, and without the peculiar aftertaste produced by *Aconitum Napellus*. The extract of the latter was dark brown, much more hygroscopic, and, when a small quantity was taken, produced the characteristic tingling, etc. The flowers of *A. paniculatum* yielded ·9 per cent., the leaves ·1 per cent. and the extract ·3 per cent. of a non-crystalline alkaloid having a very bitter taste, free from tingling, and which may probably be identical with picraconitine.

In the discussion upon this paper it was stated that from 1836 to 1851 the last-named plant was recognized by the London and Dublin Pharmacopœias, having been adopted in the belief that it was the plant employed by Stoerck in 1764. It was als stated that *Aconitum ferox*, formerly exported from Hindostan, had not been sent to the London market for about fifteen years, that German aconite root was probably not solely derived from *A. Napellus*, and that the market was at times glutted with Japanese aconite root from *A. Fischeri*. While it would be very desirable to standardize such important drugs, the difficulty in the way is the impossibility as yet of assaying for aconitine, and not for total alkaloids, including possibly quite inactive alkaloids.

EDITORIAL DEPARTMENT.

Reports on the Progress of Pharmacy.—With the increase of scientific investigations since the beginning of the present century, and more particularly during the past thirty or forty years, the publications in all departments of science have increased to such an extent that it is very difficult to remain conversant with all the facts which have been elucidated in any one branch of theoretical or applied science. The field for investigation is practically unlimited, and the investigators being continually on the increase, it is obvious that the difficulty referred to must become greater instead of decreasing. This fact is so well known and so thoroughly recognized, that at the present time, reports are being published, at stated intervals, giving a synopsis of the various publications, covering a certain field, which have been published during such a period. Some of the most valuable of such reports even find it impossible to give abstracts, but have to confine themselves to classifying the literature and merely indexing it, so as to facilitate the researches on any special subject. Of the lattter

class is the "Index Medicus," to the intrinsic value of which we have repeatedly directed attention since its publication was commenced in 1879. The necessity for such reports has become so pressing that, at present, the literature of all or nearly all sciences, and very often of more limited branches thereof, are thus rendered more readily accessible than they otherwise would be, and that most of the journals devote more or less space not merely to the republication of selected essays from other journals but to the condensation of most of them in some form or other.

Reports on subjects connected with pharmacy, covering as much as possible the literature of all countries, were commenced at an early date. In order to be of the greatest possible value, such reports should not merely be a collection of abstracts without obvious systematic arrangement, but they should be properly classified. Among the earlier ones may more particularly be mentioned those published since 1819 in "Buchner's Repertorium," which were devoted to chemistry and more especially to pharmaceutical chemistry. An annual report known as "Canstatt's Jahresbericht," commenced to appear in Germany in 1840, embracing all branches of medical science, including pharmacognosy and pharmacy, the reports on these latter having been prepared since 1844 by the late Professor Wiggers, and attained well-merited recognition for thoroughness and completeness, throughout the pharmaceutical world. Since 1866 this "Jahresbericht," embracing pharmacognosy, pharmacy and toxicology, is published as a distinct work and is now edited by Professor Dragendorff, its fame as a reliable repository of investigations made in the departments mentioned, in all parts of the world, is well established and unquestioned.

These reports being printed in the German language are, of course, inaccessible to those not conversant with that tongue; but the necessity of such an annual compendium, regularly issued, was deeply felt both in Great Britain and the United States, and in the former country the want was supplied by the British Pharmaceutical Conference, by which body the "Yearbook of Pharmacy" is published since 1870.

In the United States, the late Prof. Procter, in 1855, pointed out the desirability of preparing such a report regularly, so as to be accessible to American pharmacists, and in that year a committee was appointed by the American Pharmaceutical Association, consisting of Edward Parrish, Samuel M. Colcord and James S. Aspinwall, whose report included a provision for the appointment of a Committee on the Progress of Pharmacy, and was adopted in 1856. The first chairman of this committee was Prof. Procter, who in the following year made the first report, covering 30 printed pages, and based mainly on the publications in the English, and to a certain extent in the French language. Since that time this report has been published annually, with the exception of 1871–72, and was prepared by different members, well known to American pharmacists. About twenty years ago the report became so voluminous, and its preparation involved such an amount of labor, that it soon became evident that the plan of preparing it would have to be changed, and in 1873 the committee was abolished and its place taken by a Reporter on the Progress of Pharmacy, to which position Prof. C. L. Diehl was elected, who had pre-

viously prepared this important report for three years. Of the quality of his reports it is not necessary to speak, since all who read the annual Proceedings of the American Pharmaceutical Association, of which publication it forms a most important part, accord to its merits due praise.

We have thought it proper to give the above brief historical sketch, which will, we think, fully explain the words of caution that we feel are due to a project evidently not weighed in all its bearings. We refer to reports on the progress of pharmacy by some of the State Pharmaceutical Associations. Such reports have heretofore been made to several of these organizations, and those who have taken occasion to examine them and compare them with any of those mentioned above, will readily concede that though they may be—as some of them really are—valuable collections of abstracts as far as they go, yet that they are necessarily meagre, not in the least approaching in completeness the former, and consequently *as* reports on the progress of pharmacy, of no utility. Such reports *must* embrace the literature of nearly all countries, and to prepare them properly is a task which requires not only intelligence but also a special training and peculiar aptitude, qualities which are not too commonly found.

Moreover, such a report acquires its commensurate importance only through the circle of its readers, and instead of leading the energies producing it into a multitude of channels, each a weak one, it is by far better to concentrate the efforts upon one common object, thus insuring not only its vitality, but also increasing its efficiency and usefulness. There is no more reason for a State association than for a county society or for an individual, to prepare a report on the progress of pharmacy; on the contrary, all reputable pharmacists throughout the country should consider it a duty to further the usefulness of one of the most valuable publications of its kind by consulting it.

Much more might be said on this subject, but we consider the above as amply sufficient to prove the futile character of such divided labors; and while, on the one hand, we hope that the practice of preparing such reports, where it still exists, may soon be abandoned, we sincerely trust that it may not be undertaken in other State associations, where its introduction has been recently recommended.

OBITUARY.

Professor Joseph Decaisne, the eminent botanist, died at Paris February 8th last, having nearly completed his seventy-fifth year. He was born at Brussels, and while quite young came to the Jardin des Plantes as gardener. He wrote the monographs on Asclepiadaceæ and Plantaginaceæ for DeCandolle's Prodromus, was editor of the "Annales des Sciences Naturelles" since 1842, and published numerous essays and several works on botany, of which the Traité général de Botanique, written in conjunction with Le Mouat in 1868, has particularly attracted the attention of botanists. For many years he was Director of the Jardin des Plantes and Professor at the Museum of Natural History at Paris.

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IS GELSEMIC ACID IDENTICAL WITH ÆSCULIN?

With Observations on the Preparation, Properties and Recovery, when Absorbed, of the Important Constituents of Gelsemium Sempervirens, and Gelsemium Poisoning.

BY THEODORE G. WORMLEY, M.D.,
Professor of Chemistry in the Medical Department of the University of Pennsylvania.

In a former number of this journal (Jan., 1870) the writer announced that *Gelsemium Sempervirens* contained a non-nitrogenized principle, of an acid reaction, which was named *gelseminic*, or *gelsemic* acid; and also a strongly basic principle, which was named *gelsemia*, or *gelsemine*.

From a subsequent examination of the constituents of the plant, M. Sonnenschein and Charles Robbins concluded that the so-called *gelsemic acid* was identical in properties and composition with the glucoside *æsculin*, found in the bark of the horse-chestnut, and certain other barks ("Ber. der Deut. Ges.," Sept. 1876, 1182).

Before examining this question of claimed identity, the method, of several employed, which we have more recently found the most satisfactory for the extraction of the two important constituents of the plant, will briefly be given.

Preparation.—100 grams of the powdered dry root are macerated for two days in 400 cc. of a mixture of equal parts of water and alcohol of ·815, the mixture being slightly acidulated with acetic acid and occasionally warmed and agitated. The liquid is strained through muslin, and the solids well washed with water containing a little alcohol, the washings being collected with the first liquid. The whole is evaporated to about 200 cc., and allowed to stand until the resinous matter has deposited. The liquid is then filtered, concentrated to about 80 cc. and, if necessary, again filtered.

1. *The non-nitrogenized principle.*—This is extracted from the concentrated liquid, while it still has an acid reaction, by ether, in the

usual manner, using three or four volumes of the liquid in two or three portions.

The crystals obtained on evaporation of the ether are washed with a little absolute olcohol, which readily dissolves the adhering coloring matter. The residue may be further purified by a second extraction by ether.

A very good method of purifying the substance, especially from the last traces of the alkaloid, is to dissolve it in about two hundred and fifty parts of water, by the aid of a few drops of ammonia, and then treat the clear solution with diluted hydrochloric acid, added drop by drop until the point of neutralization is almost, but not fully reached, taking care that the first cloudiness or precipitate produced has fully crystallized before adding another drop of the acid. The crystals are collected on a small filter and washed with a little cold water.

2. *Gelsemine.*—The liquid from which the former principle was extracted is gently warmed until the dissolved ether has been expelled. It is then rendered slightly alkaline by sodium hydrate or carbonate, and the liberated base extracted by ether, which is allowed to evaporate spontaneously.

The impure alkaloid thus obtained is dissolved, by the aid of a few drops of hydrochloric acid, in about 12 cc. water, the solution filtered, and the filtrate treated with a very slight excess of sodium hydrate, when a large portion of the alkaloid will separate as a pure white precipitate. This is quickly collected on a filter and washed with pure water. The remaining portion of the alkaloid is extracted from the filtrate by ether or chloroform.

From the dried root of the plant we obtained, after this manner, ·25 per cent. of gelsemine and ·50 per cent. of the acid principle.

Is Gelsemic Acid Identical with Æsculin?

For the purpose of answering this question various samples of the gelsemium principle were examined comparatively with a sample of *æsculin* prepared by E. Merck, of Darmstadt. It consisted of a spongy, sparkling white mass of minute (microscopic) needles and prisms. On comparing it with a somewhat colored preparation obtained from horse-chestnut bark, the substances presented essentially the same properties in the several respects examined.

This comparative examination showed:

A. These principles agree more or less in the following respects:

1. Both substances are readily soluble in the *caustic alkalies*, forming solutions which have a yellow color by transmitted, and appear blue by reflected light, the fluorescence appearing in both instances even in very highly dilute solutions, being distinctly marked in a 100,000th solution.

The fluorescence of the gelsemium principle, however, is *greenish blue*, whilst that of æsculin is deep *sky blue.* The fluorescence in both instances is destroyed by free acids

2. *Nitric acid* dissolves both substances with a yellow color, and the solutions, when treated with excess of ammonia, assume a deep red color. This red coloration may be obtained from even the 1-50,000th of a grain of either substance.

The nitric acid solution of the gelsemium principle, when present in sufficient quantity, has an orange-red color, whereas that of æsculin is yellow.

B. They differ more or less in the following properties:

1. *Crystallization.* — The gelsemium compound very readily assumes the crystalline form, even in the presence of comparatively large proportions of resinous matter, whereas *æsculin* crystallizes with some difficulty, even from pure solutions. Thus, the 1-10,000th grain of the former substance, when separated from one grain of solution, is left in the form of needles, whilst crystals can only be obtained from rather strong solutions of æsculin, and then usually appear as transparent spherical masses, with some dense tufts of short prisms.

2. *Solubility.—a. Water.* The gelsemium substance, when pure, requires 2,912 parts of water for solution, even when excess of the powder is kept in contact with the liquid at a temperature ranging from 18° to 24°C. (65° to 75°F.), for twenty-four hours.

Under like conditions, Merck's æsculin dissolved in 401 parts of water. According to Trommsdorff æsculin requires 576 parts of water for solution, but according to Minor it dissolves in 300 parts (Gmelin's Hand-Book, xvi, 22).

b. Ether. One part of the gelsemium principle was readily taken up by 330 parts of *ether* of sp. gr. ·728, whereas *æsculin* required at least 36,000 parts of the same fluid for solution.

So also, the former principle is rather freely soluble in *chloroform*, whilst the latter is nearly or wholly insoluble in this liquid.

3. *Sulphuric acid* dissolves the gelsemium substance to a more or less yellowish solution, which when warmed in a water oven (if the

substance is pure) undergoes little or no change. Æsculin readily dissolves in the acid, but on warming the solution it quickly acquires a brownish or chocolate color and becomes charred.

If a drop of aqueous ammonia be allowed to flow into a drop of the sulphuric acid solution of the gelsemium compound, a dirty white deposit or cloud of very minute crystalline needles separates at the margin of contact of the liquids.

If only a minute drop of the acid be employed and excess of ammonia be avoided, even the 1-10,000th grain of the substance will in this manner yield a very satisfactory deposit of needles. If the drop of liquid be allowed to evaporate, these crystals may be re-examined, even several times, by moistening the residue with a minute drop of water, which will quickly dissolve the ammonium salt, whilst the needles will remain, they being apparently insoluble under these conditions.

This reaction is highly characteristic of the gelsemium principle.

A sulphuric acid solution of *æsculin* under like conditions fails to yield any crystals, unless a comparatively large quantity is present and the mixture be evaporated to about dryness, when transparent nodular masses with some groups of prisms may appear.

4. *Hydrochloric acid* fails to dissolve or act upon the gelsemium compound, even under the heat of a water bath. Æsculin is readily soluble in this acid.

In the following liquid reactions the results refer to the behavior of a few drops of 1-100th solutions of both principles.

5. *Nitrate of silver* produces in a solution of the gelsemium principle a copious brownish-yellow precipitate, which soon darkens in color, and finally the mixture becomes deep blue-black, due to the reduction of the silver salt. This reaction will manifest itself, after a time, even in a 1-50,000th solution.

Æsculin yields from a 1-100th solution, a slight dirty yellow precipitate, which remains unchanged for several minutes; it then slowly darkens.

6. *Corrosive sublimate* throws down a copious yellowish precipitate, from which the organic acid quickly separates as large tufts of needles.

Æsculin fails to yield a precipitate or crystals.

7. *Bromine* in *bromohydric acid* produces a copious green deposit, which quickly acquires a blueish and finally a brownish color.

Æsculin yields a slight yellow precipitate, which becomes yellowish-gray.

8. *Sulphate of copper* causes in a solution of the acid a dirty brown precipitate, which soon assumes a dull red color, and crystalline needles separate.

Æsculin yields a blueish white deposit, which undergoes little or no change.

9. *Acetate of lead* (neutral) produces a copious yellow precipitate, which after a time is partly changed into very minute star-like groups of crystals. These are insoluble in ammonia, but readily soluble in acetic acid, being quickly replaced by slender needles of the free acid.

Æsculin yields a somewhat similar precipitate, but no crystals were obtained.

10. *Physiological action.—a.* 0·010 gram (about $\frac{1}{6}$ grain) of the gelsemium principle was administered hypodermically to a frog. After a few minutes the eyes were fluorescent, and the animal seemed sluggish; after half an hour it was somewhat excited and apparently weak. No other marked symptoms were noticed during the several hours the animal was observed.

A similar quantity of *æsculin* produced fluorescence of the eyes, but no other apparent effect.

b. 0·033 gram ($\frac{1}{2}$ grain) of the gelsemium substance, prepared by precipitation with hydrochloric acid, being injected into the peritoneum of a frog, was quickly followed by violent agitation; the animal became rigid, and reflex action was markedly diminished. In *five minutes* the animal was apparently lifeless; there was rigidity of the abdominal muscles, which slowly relaxed. After forty minutes, the heart had ceased to beat, was relaxed and not irritable.

c. A similar quantity, injected into the posterior lymph sack, was quickly followed by great agitation and general prostration. In fifteen minutes active voluntary movements appeared, and there was marked fluorescence of the entire eye-ball. After forty-five minutes the heart was found still beating, but ceased fifteen minutes later.

In another experiment, a like quantity caused a complete cataleptic condition and death within ten minutes.

d. 0·033 gram of *æsculin* injected into the peritoneum of a similar frog produced *no apparent effect*, other than a marked fluorescence of the eyes, which continued some fifteen hours.

For these physiological experiments, I am much indebted to Dr. Edward T. Reichert. These results, in regard to the gelsemium principle, confirm in a measure those previously obtained by Dr. Isaac Ott. —(*American Practitioner*, 1877.)

Conclusions.—It is needless to add that the only conclusion from the foregoing comparative results is that the principles examined *are very different substances.* Hence the name *gelsemic acid* will be retained provisionally for the gelsemium principle.

Gelsemine.—As supplementary to our former paper on the subject, some of the more important properties and reactions of gelsemine may be mentioned.

In its pure state gelsemine is a colorless, odorless solid, having a persistent bitter taste. It has not yet been obtained in the crystalline state. At something below 100°C. it fuses to a colorless liquid. Gelsemine completely neutralizes acids, forming salts, most of which are freely soluble in water and alcohol.

The pure alkaloid is soluble, under ordinary conditions, in 644 parts of water. It is freely soluble in ether and in chloroform.

The most characteristic reactions of the solid alkaloid are the following:

1. *Sulphuric acid* dissolves gelsemine with a reddish or brownish color to a solution which after a time assumes a pinkish hue. If the solution be warmed on a water-bath, it acquires a more or less purple or chocolate color.

If a small crystal of *potassium bichromate* be slowly stirred in the sulphuric acid solution, reddish-purple streaks are produced along the path of the crystal. If the potassium salt be used in the form of *powder*, or, as advised by Sonnenschein and Robbins, be replaced by *ceric oxide* (CeO_2 formerly Ce_3O_4), the purplish or reddish-purple coloration manifests itself more promptly and strongly, and may be obtained from even the one ten-thousandth grain or less of the pure alkaloid. For the detection of these minute quantities, however, it is essential that only very minute quantities of the acid and powder be employed.

This reaction of gelsemine—as remarked by Sonnenschein and Robbins, who first observed it with the cerium compound—resembles somewhat that of strychnine; but these alkaloids could not thus be confounded.

2. *Nitric acid* causes gelsemine to assume a brownish-green, quickly changing to a deep *green*, color, which slowly diffuses itself through the liquid. Almost the least visible quantity of the alkaloid, if touched with only a very minute drop of the acid, will yield this green coloration in a marked degree.

This reaction readily distinguishes gelsemine from strychnine and the other alkaloids.

Solutions of the *salts* of gelsemine are colorless, and have the strongly bitter taste of the alkaloid. These solutions yield precipitates with a number of different liquid reagents, even in some instances when highly dilute; but in no instance is the reaction peculiar to this alkaloid.

Physiological action.—0·008 gram ($\frac{1}{8}$ grain) of gelsemine, administered hypodermically to a cat, caused very marked symptoms in fifteen minutes, and death in one hour and a half.

0·010 gram, given to a frog, produced, after half an hour, great prostration, followed by tetanic convulsions and death in about four hours.

0.033 gram of the alkaloid, in the form of chloride, was injected into the peritoneum of a frog. The animal soon opened its mouth convulsively, the jaws fell at intervals, and there was quickly great muscular prostration. In twenty minutes the body was completely relaxed; the muscles not irritable under pricking; reflex action was greatly diminished, and life seemed to be extinct. On opening the thoracic cavity it was found that the heart had been arrested in diastole and was not irritable.

Gelsemium Poisoning.—The cases of gelsemium poisoning thus far reported have been, with two or three exceptions, the result of accident or ignorance. The preparation of the drug most frequently employed is the *fluid extract*, each fluidounce of which represents 480 grains of the dried root. This preparation, as found in the shops, as we have heretofore shown (this journal, 1877, 151), usually contains ·2 per cent. of gelsemine and ·4 per cent. of gelsemic acid.

Of *twenty-five* cases of gelsemium poisoning that we have collected, (some private), *thirteen* proved fatal. The *fatal period* varied from *one hour* to about *eight* hours. Very small quantities of the drug may cause death. A case is reported in which a quantity of a tincture equivalent to about *twelve minims* of the fluid extract proved fatal to a child aged three years. In another instance, four doses of *fifteen minims* each of the fluid extract, repeated at short intervals, caused the death of a healthy man in less than four hours after the last dose was taken. So, also, a teaspoonful of the same preparation proved fatal to a woman.

There is no chemical *antidote* known for this kind of poisoning.

The application of *electricity* has in several instances proved very beneficial. In others, the use of *morphine* hypodermically has been attended with good results.

Chemical Analysis.—In gelsemium poisoning the gelsemic acid and the alkaloid are both absorbed, and enter the blood apparently in the proportion in which they are found in the plant. Hence, in poisoning by the drug, it becomes necessary to direct the examination for the absorbed poison to the recovery of both these principles. This is the more important, since the acid is apparently not much less poisonous than the alkaloid, and so readily reveals its presence by its fluorescent properties.

The general method for the recovery of strychnine and like substances from the blood and tissues is about equally applicable for the recovery of the gelsemium principles. As these substances are readily soluble both in ether and chloroform, either of these liquids may be employed for the extraction. The gelsemic acid would, of course, be found in the ether extract from the prepared solution, while it still had an acid reaction; whilst the alkaloid would be extracted from the solution after it had been rendered alkaline.

In applying the tests for gelsemic acid to the ether residue from the acid solution it should be remembered that although the reaction of the nitric acid and ammonia test is common to gelsemic acid and æsculin, yet when obtained from an *ether* extract, it is characteristic of the former substance, since æsculin is not extracted by ether.

The blood and liver of a cat which had been killed, after several hours, by the drug, were examined, in the main, after this general method. The first ether extract, in both instances, was distinctly fluorescent, and on evaporation left the gelsemic acid, in part at least, in its crystalline state. The true nature of these crystals was readily established by the appropriate tests. So, also, about equally satisfactory evidence of the presence of gelsemine was obtained from the ether residues from the alkaline solutions.

As a conclusion from these and other similar results, it would appear that in gelsemium poisoning evidence of the presence of the poison in the blood may be more readily and fully obtained than in the case of any of the other vegetable poisons.

Philadelphia, June, 1882.

NOTES ON THE USEFUL AMERICAN MYRTLES.

BY JOHN M. MAISCH.

Read before the Pennsylvania Pharmaceutical Association at Altoona, June 14.

After referring to the statement in Mr. Riise's paper on bay rum (see p. 278, June number) relating to the varieties of the bayberry tree, scarcely to be distinguished botanically, the author continues:

There being a large number of myrtles indigenous to the West Indies and many also to South America, it may not appear inappropriate to give a brief account of those American species which yield useful and more or less medicinal products. Since by far the largest number of these plants possess aromatic properties, and many of them are also astringent, it may be presumed that the majority of them could be employed medicinally; but in this sketch I shall confine my remarks to those only which have, at various times, attracted some attention in Europe or in this country.

The order Myrtaceæ has affinities, more or less intimate, with a number of other orders, and its limits are variously defined by different botanists, so as to embrace a larger or smaller number of tribes or suborders. Between 1700 and 1800 species belong to it, all of which, with but few exceptions, inhabit tropical countries.

The *Barringtonieæ*, comprising tropical trees with opposite undotted leaves, are at present generally separated from the Myrtles. They are often emetic and stupefying, or bitter and astringent, and in some species an unpleasant odorous principle is prevalent.

The suborder *Granateæ* or *Puniceæ* contains only a single species, the well known pomegranate, which is indigenous to Western Asia, from Northern India to the Mediterranean, and is now cultivated everywhere in subtropical countries and the warm temperate zone. It is destitute of aromatic properties, the bark of the root and trunk as well as the rind of the fruit being anthelmintic and containing considerable tannin. Some botanists place this tree into a separate natural order, while others have united it with the order of Lythraceæ.

The suborder *Lecythideæ* is likewise free from aromatic properties and is remarkable for the large woody fruits, which in some species open by a kind of lid, on which account they have been called *monkey-pots.* The seeds contain a considerable quantity of fixed oil, sometimes over fifty per cent., and are often edible, being of an almond like flavor, though those of a few species are reputed to be more or less

deleterious in their raw state. The well known *Brazil nuts* or *Para nuts,* known as *touka* in Cayenne, as *juvia* on the Orinoco, and as *castanha do Pará* in Brazil, are the seeds of Bertholletia excelsa, *Kunth.* The so-called *Sapucaya nuts* are produced by Lecythis Zabucajo, *Aublet,* and of nearly the same flavor are the seeds of Lecythis Ollaria *Lin.* The fruit of Couroupita guianensis, *Aublet,* is globular, attains a diameter of six or eight inches and is known as *canon ball, boulet de canon;* it contains in its nearly ripe condition a sweet acidulous pulp, furnishing a refreshing beverage, useful in febrile diseases. These trees are indigenous to South America.

The suborder *Chamælaucieæ* has, like the following suborders, evergreen and mostly glandular-punctate leaves. The plants known as *fringe-myrtles* are shrubby, of a heath-like aspect, with small leaves, are indigenous to Australia and are not used medicinally

The suborder *Leptospermeæ* comprises, with very few exceptions, Australian trees and shrubs, with opposite or alternate leaves. The volatile oil of one species, Melaleuca minor, *Smith,* is the well-known *oil of cajuput.* The volatile oil distilled from the leaves of Mel. ericæfolia, *Sm.,* Mel. linariæfolia, *Sm.,* Mel. Leucadendron, *Lin.,* and perhaps of other species, are very similar. The last-named species is known in Australia as *tea tree,* because the leaves are employed like tea; the *white tea tree* is Mel. genistæfolia, *Sm.* The leaves of different species of Leptospermum, like L. scoparium, *Sm.,* L. Thea., *Willdenow,* and others are similarly used.

But the suborder has attracted universal attention through the Eucalyptus globulus, *Labillardière,* which through its rapid growth, and perhaps also through the exhalation of its volatile oil, has been found useful in subtropical marshy countries for destroying malaria. The leaves of all species of this genus yield volatile oils, which sometimes differ widely in odor and composition. Several species yield astringent exudations, drying into a kino-like substance; the exudation of others contains more gummy matter, and of one or two species it is of a saccharine nature; the bast fibres of certain species have been found serviceable in the manufacture of paper.

Of the suborder *Myrteæ,* there are not less than 53 species described by Grisebach, growing in the British West Indian islands, all of which are more or less aromatic. The number growing in all the West Indian islands and in South America is much larger. The species best known throughout the civilized world is doubtless the clove, Caryophyllus

aromaticus, *Linné* (s. Eugenia caryophyllata, *Thunberg;* Myrtus Caryophyllus, *Sprengel*) which, though originally indigenous to the Mollucca Islands is now perfectly naturalized in the West Indies and South America. The unexpanded flower-buds, which constitute the cloves of commerce, contain, besides a considerable amount of tannin, an aromatic volatile oil, of which the eugenol or eugenic acid constitutes the most important part, and very similar constituents are met with in the less aromatic pedicels, known in commerce as *clove stalks*, and in the fruit known as *mother cloves* and *anthophylli*. That the allspice, the fruit of Pimenta vulgaris, *Wight et Arnott*, s. Eugenia (Myrtus, *Lin.*) Pimenta, *De Cand*, likewise contains a volatile oil, chemically identical with the oil of cloves, is well known; besides the fruit, the leaves are employed in the West Indies as a spice and in medicines, and the young straight shoots of the plant are largely exported to be used for walking canes. The same volatile oil seems to be present in the closely allied Pimenta (Amomis, *Berg*) Pimento, *Grisebach*, which differs from the preceding chiefly by its five-lobed calyx and by its longer ovate-oblong (instead of globular) fruit. The bayberry tree of the West Indies, Pimenta acris, *W. et A.*, has, likewise, pentaphyllous flowers and a more ovoid fruit, however the coriaceous leaves are distinctly reticulate on the upper surface, and less distinctly so beneath, while the preceding species does not show any projecting veins above. The typical form of the bayberry tree has the young branchlets, somewhat four-angled, while the variety pimentoides, which was formerly regarded as a distinct species, Myrcia (Amomis, *Berg*), pimentoides, *DeC.* s. Myrtus (Eugenia) citrifolia, *Poir.*, has acute branchlets decurring from the petioles, and usually broader and more obovate leaves. The oil of bay, distilled from the leaves of the species mentioned has been in the American market for about 20 years; that it contains eugenol was proven by Mr. R. Rother in 1876 ("Chic. Pharmacist p.. 130), and this was corroborated by Prof. Markoe in 1877 ("Proc. Am. Phar. Assoc., p. 435). The fruit contains the same volatile oil, and not unlikely also the flower-buds; at least the tree is known as *clove* in some of the West Indian islands (Grisebach). These species and varieties possess almost identical stimulating properties, and and may be substituted for one another in their applications as medicine or as spice, almost indiscriminately, or at least as far as the difference in flavor will permit.

The clove-like odor is not confined to the species mentioned before,

but is met with in other plants and doubtless depends upon the presence of eugonol. Eugenia (Myrtus, *Gomez*) pseudo-caryophyllus, *DeC.*, and Calyptranthes aromatica, *St. Hilaire*, both indigenous to Brazil, and known there as *craveiro da terra*, possess this flavor, and the young flower-buds, particularly those of the latter, have deen recommended as a good substitute for cloves; a clove-like flavor is observed in all its parts, and the ovate fruit is extensively employed both for culinary purposes and also in medicine.

While it is undoubtedly true that botanical relationship is often indicative of similar properties and composition, yet the odorous compounds met with in the volatile oils of nearly related species are often very dissimilar, if not in relation to their chemical nature, at least in their sensible properties, more particularly in their odor. Thus, for instance, Myrcia (Myrtus, *Vahl*) coriacea, *DeCand.*, which grows in many of the West Indian islands, so closely resembles the bayberry tree that it has been confounded with it by as thorough a botanist as Swartz, but the leaves have a lemon-like odor, entirely distinct from the allspice-like flavor of the former, and it is very obvious that the volatile oil or the spirit distilled from them must have very different properties from those of good oil of bay or of bay rum. The leaves, like those of other myrtles, vary considerably in shape and are either oval, roundish-elliptic or obovate, obtuse or emarginate, and usually opaque, though marked with impressed dots, some of which become finally pellucid; the veins are not conspicuous and are usually joined near the revolute margin. There are several varieties differing in the pubescence of the branchlets and petioles, in the length of the peduncles, and the number of flowers borne by them. The leaves possess antiseptic and astringent properties, the bark is employed for tanning, and the wood is used for dyeing yellow, green and brown.

Eugenia (Myrtus, *Swartz*) glabrata, *DeCand.*, is acidulous aromatic in all its parts, more particularly the black oblong berries.

Eugenia (Myrtus, *Swartz*) procera, *Poir.*, which is found in Jamaica and adjacent islands, and also in Southern Florida, has pellucid-punctate leaves which finally become leathery and opaque and then have but a slight odor, while the flowers are very fragrant.

Eugenia (Myrtus, *Sprengel*) fœtida, *Persoon*, of Guiana has leaves possessing a disagreeable odor, a property rarely met with among the myrtles.

Anamomis (Myrtus, *Swartz;* Eugenia, *Willdenow*) fragrans, *Grise-*

bach, grows in mountainous regions from Jamaica southward to Guiana; its rigid variable leaves are of a strong balsamic flavor, and are employed both externally and internally. The variety cuneata, s. Eug. emarginata, *Macfillan,* is known as *zebra wood.*

The odor of the flowers of Eugenia (Myrtus, *Swartz*) virgultosa, *De Cand.,* indigenous to Cuba and Jamaica, resembles that of rhubarb.

Eugenia (Myrtus, *Swartz*) disticha, *De Cand.,* is known in Jamaica as *wild coffee,* because the red ovoid berries, which are about $\frac{1}{4}$ inch long, resemble the fruit of coffee and the fresh seeds have a similar taste.

Eugenia (Myrtus, *Swartz*) Gregii, *DeCand.,* has oblong or roundish-obovate berries of a leathery texture and a strongly acrid-aromatic flavor. Acrid aromatic properties are likewise found in the root and seeds of Eugenia (Myrtus, *Sprengel*) angustifolia, *Lam.,* which grows in San Domingo.

The yellow depressed-globose berries of the Brazilian Eugenia (Myrtus, *Martius*) dysenterica, *DeCand.,* are of an agreeable acidulous taste, but are apt to prodnce diarrhœa. The red or yellow berries of the West Indian Eugenia floribunda, *West,* are sweet and acidulous, are eaten raw and cooked, and on fermentation yield a pleasant vinous beverage. Eatable berries are also produced by several other West Indian species of Eugenia, the most important of which appear to be Eugenia (Myrtus, *Swartz*) ligustrina, *Willd.,* s. Myrtus cerasina, *Vahl,* with a black two-seeded fruit called *pitangueira dò mato* in Brazil; Eugenia (Myrtus, *Swartz*) lineata, *De Cand.,* with a scarlet-red cherry-like but several-seeded fruit; and Eugenia uniflora, *Lin.,* s. Eug. Michelii, with a red-furrowed one-seeded fruit, which is known in some parts as *Cayenne cherry* and in Brazil as *pitangueira*; the last named species is also distributed over a considerable portion af tropical South America, and has been naturalized in the East Indies. In like manner are also used the violet-purplish plum-sized berries of the Brazilian Eugenia (Myrtus, *Martius*) cauliflora, *De Cand.,* known as *jabuticaba.*

One of the myrtles of tropical America has been introduced into and naturalized in most other tropical countries, where it is highly valued on account of its fruit, which resembles a medium-sized pear, with a downy, veined, brittle and thin rind, and containing a whitish, yellowish or reddish pulp, of a very agreeable sweet, acidulous and aromatic flavor. The fruit is known as *bay plum, guava* or *guayava,*

and in Brazil as *araçá mirim* and *araçá goiaba.* It comes from a small tree, the Psidium Guava, *Raddi,* under which name two or three nominal species are comprised, chiefly distinguished by the shape of the fruit; this is either pyriform or globular, the latter apple-shaped or red guava being regarded as rather inferior to the former, or white guava. The unripe fruit is astringent, and is employed like other astringents; the young leaves and buds have similar properties, also the root and the bark, and are used both internally and externally. The white guava is most esteemed for eating in the raw state; but the pulp of both varieties is used in the West Indies in the preparation of two kinds of preserve, which are known as guava jelly and guava cheese, and furnish a not unimportant article of commerce.

The dark red spherical, well-flavored fruit of Psidium Cattleyanum, *Sabine,* has the size of a large plum, and on account of its purplish pulp is known as purple guava, and in Brazil as *aráçaseiro do campo;* it is indigenous to Brazil and naturalized in China.

Psidium guineense, *Swartz,* is cultivated in the West Indies for its somewhat smaller, dark yellow and internally red berry, and the fruit of Eugenia (Myrtus, *Sprengel*) pseudo-psidium, *Jacquin,* is esteemed there under the name of *bastard guava.*

Psidium montanum, *Swartz,* the *mountain guava* of Jamaica, has a globular fruit, scarcely ½ inch in diameter, which, like the flowers, has a bitter almond odor. A species of St. Vincent Psidium Guildingianum, *Grisebach,* with small berries, only ¼ inch thick, has in its habit considerable resemblance to Myrcia coriacea and Pimenta acris, but the rigid leaves are devoid of pellucid dots.

Campomanesia (Psidium, *Aublet*) aromatica, *Grisebach,* has yellow globular eatable berries, and a foliage of a balm-like odor. The similar fruit of Campomanesia lineatifolia, *Ruiz et Pavon,* is known in Peru as *palillo,* and that of Camp. cornifolia, *Kunth,* in New Grenada, as *guyavo de Anselmo.*

In this oonnection should also be mentioned the *rose apple* and *Malay* or *Otaheïte apple,* which have been naturalized in the West Indian islands, and there, as in tropical Asia, their native country, are highly valued on account of their agreeable taste and rose-like odor. The former, Jambosa vulgaris, *De Cand.,* s. Eugenia (Myrtus, *Kunth*) Jambos, *Lin.,* is a globular or oval yellowish or reddish berry, about 1½ inch in diameter; the latter, Jambosa (Eugenia, *Lin.*; Myrtus, *Sprengel*) malaccensis, *De Cand.,* is pear-shaped or top-shaped, 3 or 4

inches long, of a crimson or blackish-red color externally, and with a white, juicy pulp.

The bark and leaves of both species possess strongly astringent properties, and the seeds are aromatic and acrid. The fruit of several other species indigenous to tropical Asia is employed there like those mentioned.

The jambolana, Syzygium (Eugenia, *Lam.;* Calyptranthes, *Willd.*) Jambolanum, *De Cand.*, is also naturalized in Jamaica and other West Indian islands. The dark red oval and somewhat curved fruit is of the size of a large cherry, has an astringent, acidulous taste, and is employed in gargles; the bark, notably that of the root, is astringent and aromatic. Several other species of this genus, mostly indigenous to tropical Asia, bear eatable berries.

The plants of the genus Myrtus, to which the frequently cultivated common myrtle of Southern Europe, Myrtus communis, *Lin.*, belongs, have, likewise, aromatic and astringent properties, and their berries are in some cases eatable, like Myrtus Luma, *Mill.*, whose fruit is very palatable; Myrtus microphylla, *Humb. et Bonpl.*, the red berries of which are of the size of a pea and very sweet, and Myrtus Ugni, *Molina,* which has thicker brown-red berries, of a faint rosemary odor; these species are indigenous to Chili and Peru, and the leaves of the *ugni* are used as a substitute for tea. The *guayavo arayan* of the Orinoco valley is Myrtus salutaris, *Kunth,* the root of which is highly valued as an astringent.

Somewhat similar properties are possessed by a Chilian plant called *cheken* or *chekan,* which enjoys a local reputation, and the use of which in Europe and in North America has been recently revived. Eugenia Cheken, *Molina,* is a small shrub, about four feet high, with a rough, brown, strongly astringent bark; the leaves are sessile, about an inch long, elliptic or roundish, somewhat narrowed at both ends, delicately feather-veined, light green and smooth; the peduncles are axillary and terminal, five- or six-flowered; the berries are globular, about $\frac{1}{3}$ inch thick, externally black, and contain two somewhat heart-shaped seeds. The bark and the leaves have been employed internally in indigestion, diarrhœa and various other affections of the bowels and kidneys, and externally, in the form of fomentations, in ophthalmic inflammations, rheumatic and other pains, and more recently, as inhalations of the vapors from the aqueous infusion, in bronchitis, laryngitis and diphtheria.

Very few myrtles are indigenous, but none peculiar to the United States. The five species, enumerated in Chapman's Flora, are small trees, confined to Southern Florida. They are Eugenia dichotoma, *De Cand.;* Eug. procera, *Poir.*, Eug. monticola, *De Cand.;* Eug. buxifolia, *Willd.*, and Calyptranthes (Myrtus, *Lin.*) Chytraculia, *Swartz.* Not a single myrtle has been found indigenous to California, though the climate is well suited for the growth of different species of Eucalyptus, and doubtless of other genera of this interesting and useful natural order. The States bordering the Mexican Gulf may likewise be adapted for the acclimatization of some of the numerous myrtles.

NOTE ON BOROGLYCERIDE.

By Thomas D. McElhenie.

Read before the Kings County Pharmaceutical Society, June 13th.

In a paper read some time ago before the Society of Arts, London, Prof. F. S. Barff announced the new antiseptic, under the above title, as prepared and tested by him. The paper and the subsequent discussion were confined to domestic and culinary uses of the substance in the preservation of all kinds of food-products, raw and cooked, and brought out a great many interesting facts. For instance, cream prepared by adding an ounce of boroglyceride to one quart, has been sent from London to Zanzibar, passing through the tropics and arriving in good condition; also to Jamaica. It occurred to me, on reading the account in the "Scientific American" Supplement, that an article of such valuable antiseptic properties, and withal so harmless in itself, would prove of great value in pharmacy, and probably in medical and surgical practice. Two or three prominent surgeons of this city have it now under investigation as a dressing for wounds. The preparation is not a secret or proprietary article in any sense, the author having given it for public benefit, and the process is as follows: Ninety-two parts of pure glycerin are heated to about 150°C. (302°F.) and sixty-two parts of pure boracic acid in powder are gradually added. Steam is given off by the formation of water, and the mass loses weight. The operation, in quantities of five pounds or more, requires about a day to complete, as the viscidity of the melted mass allows the steam to bubble out very slowly. It is known to be finished when it ceases to lose weight and dissolves freely in water at

ordinary temperature. The ingredients are used in the proportion of their atomic weights, and the reaction is as follows:

$$C_3H_5\begin{matrix}HO\\HO\\HO\end{matrix} + H_3BO_3 = C_3H_5BO_3 + 3H_2O$$

The hydroxyls of the glycerin being replaced by the boric oxide, unite with the hydrogen liberated therefrom to form water, and this passes off as vapor. It amounts to a little over one-third of the whole mass, or 54 parts in 154, the yield being 100 parts for each 92 parts of glycerin employed, and consisting of 41 parts of glyceryl and 59 parts boric oxide. The cooled product is solid, brittle, and transparent, has a light amber color, and a shining fracture. These data are true of the preparation as made in a porcelain kettle over a direct flame. The heat of a water bath is not sufficient to effect the combination. It could probably be made on a large scale in jacketed kettles by the use of superheated steam, and in this way would doubtless be lighter in color. It is freely soluble in warm water, sparingly soluble in alcohol at 60°F., and in 5 parts at 120°; insoluble in ether and chloroform at 60°F. The strong alcoholic solution will probably prove an excellent means of impregnating lint, cotton and gauze with boroglyceride for surgical use.

If the compound is melted in a water bath, and an equal weight of glycerin added, a dense clear mixture is obtained which remains fluid on cooling, and is a very convenient form for many uses, being 50 per cent. by weight of the antiseptic. This glycerol, as we may term it, will mix clear with an equal volume of alcohol. A 5 per cent. solution of boroglyceride is not affected by tannin, tincture of chloride of iron, Monsel's solution, or the mineral acids. These points may prove useful in treating diphtheria, in which an antiseptic spray is often employed.

As might be expected, boroglyceride is hygroscopic, soon becoming damp and greasy on an exposed surface.

A convenient form for dispensing will be found that of 2-ounce cakes, moulded in oiled camphor ice tins. One or more dissolved in the requisite quantity of water will furnish readily a solution of any desired percentage. These cakes should be wrapped in wax paper and tin foil as soon as cold, to prevent hydration.

As to practical tests of this substance in pharmacy, it is too soon to have acquired much information on this head. However, I have a

few specimens of readily putrescible substances, tending somewhat to show its power. The contents of two eggs, with 2 fluidrachms of a 10 per cent. solution, have kept sweet from May 22d. The expressed juice of two pounds of finely-chopped lean beef, with fat and pulpy matter which went through the press, has kept sweet from May 29th with $\frac{1}{2}$ ounce boroglyceride. This shows the feasibility of preparing a superior nutriment for invalids, and deserves fuller investigation. Mucilago Acaciæ, U. S. P., substituting the 5 per cent. solution for water, made June 1st, is quite sweet. 120 grains of French gelatin were dissolved in 16 ounces of water on June 5th, and divided in two portions, one being left unprotected, while to the other 1 dram of boroglyceride was added. The latter is quite good at eight days old, while the former is becoming putrid. Boroglyceride will keep infusions, decoctions, solutions of the alkaloids, etc., from spoiling. Fruits and fruit juices for use in beverages can be kept in this way without sugar, and made into syrups at any time, thus securing all the flavor. It also furnishes an excellent means of preserving anatomical specimens at a very small cost. The skin and tissues are not shrunken as they are in alcohol.

You will see on the table some specimens illustrating the foregoing remarks. Among the most interesting to surgeons are absorbent cotton and crinoline saturated with a 20 per cent. alcoholic solution of boroglyceride.

P. S.—After the foregoing was written I saw the statement in "Oil and Drug News," that boroglyceride had been patented at Washington under the title of Barff's Preserving Compound. I presume that this is to secure to the inventor the sole right to use it in preparing and transporting beef on a large scale from North or South America to Great Britain. This presumption is strengthened by the fact that another process, known as the Jones Patent, is being tested in London. This consists in injecting into the aorta of animals, after stunning them with a blow, but before death, of a solution of boracic acid. I do not imagine that the inventor would trouble any one making, vending, or using the antiseptic for medical, surgical, or pharmaceutical uses. I have written to the inventor, and may be able to report on this point at our September meeting.

Brooklyn, June 12, 1882.

SEPARATION OF ETHER.

By C. J. H. Warden.

In separating quinine and amorphous alkaloids from the mixed cinchona alkaloids by agitation with ether, the subsequent removal of the ethereal layer from undissolved alkaloid and from the aqueous stratum is an operation of some little difficulty. If the ether be decanted off, or taken up by a pipette, small quantities of solid matter, as well as watery fluid, are also likely to be removed, while the ordinary separating funnels do not facilitate the operation. To obviate these difficulties the following apparatus was devised. The apparatus is essentially a filtering syphon, and consists of a syphon-shaped tube of thick glass, of small bore, on the shorter limb of which a small funnel has been blown, which is provided with a narrow projecting lip, and with a ground flat rim, while the other end of the larger limb is drawn out. The shorter limb is mounted on a cork, in which there is a second aperture, which carries a small bent tube. The cork fits the bottle in which the operation of agitation with ether has been conducted, and which should be long and narrow. To use the apparatus the funnel is lightly stuffed with a few fragments of cotton wool, and a piece of filter paper tied over the mouth, the flange preventing it from slipping, and the superfluous paper is cut off short. The funnel is then introduced a short distance below the surface of the ether, and the cork fixed. The apparatus has now somewhat the appearance of a wash-bottle, save that the tube from which the liquid escapes is three or four times the length of the tube which is immersed in the liquid. On gently blowing through the open end of the small tube—which may conveniently have a piece of india rubber tubing attached—the ether is forced through the filter and fills both limbs of the syphon, and then continues to flow automatically into a reservoir placed for its reception. As the ethereal stratum diminishes, the tube carrying the funnel is depressed until its flat surface is within a line or so from the surface of the aqueous layer, and is engaged in the precipitate. When this occurs, air has again to be blown through the small tube, and this is continued until drops of ether escape only at long intervals. The cork carrying the tubes is then removed, fresh ether poured into the bottle, agitated, and the series of operations described above again performed; and this may have to be repeated a third time. When it is judged the precipitate has been exhausted of principles soluble in ether, the syphon is removed, and any particles adherent to the base or sides of

the funnel brushed off, and the funnel with its attached filter paper, as well as the exit end of the syphon, washed with a small quantity of ether or alcohol. Obviously the apparatus may be used for all operations in which ether, etc., is used for the separation of alkaloids or fatty principles. By having a third aperture in the cork, and fitting into it the delivery tube of a burette, the apparatus could be employed in certain volumetrical analyses. Under such circumstances the tube carrying the funnel should be depressed until the mouth of the funnel is almost in contact with the bottom of the bottle, and the necessary agitation of the fluid, after addition of the precipitant, would then be effected by drawing air through it by the small bent tube.—*Phar. Jour. and Trans.* May 6, 1882; *Jour. of Soc. of Chem. Indus.*

ANALYTICAL RESEARCHES AND INVESTIGATIONS.

COLLATED BY PROF. FREDERICK B. POWER, PH.D.

Two New Methods for the Detection of Cadmium in the Presence of Copper. By Anton Orlowsky.—1. The solution, from which the bismuth has been removed, is acidulated with hydrochloric acid, stannous chloride added until decoloration ensues, and then heated to boiling with precipitated sulphur, whereby the entire amount of copper is precipitated as cuprous sulphide; from the filtrate the tin is precipitated by an excess of ammonia, filtered, and the filtrate tested with ammonium sulphydrate for cadmium.

2. The solution, freed from bismuth, is acidulated with hydrochloric acid, sodium hyposulphite is then added and the mixture boiled until the yellow precipitate which is first produced changes to a dark brown; the filtrate is then tested for cadmium.—*Chem. Zeitung*, No. 24, 1882, p. 475, from *Ztschr. Anal. Chem.*, 21, p. 214.

Distinction of Bee Honey from Artificial Honey. By Dr. Planta. —For the preparation of artificial honey, glucose and cane sugar syrup are principally employed. If such a manufactured honey be mixed with alcohol, a white precipitate of dextrin is thrown down, whilst bee honey by the same treatment only becomes strongly turbid. The most certain means of recognition, however, is the estimation of the sugar, the amount of grape sugar being first estimated directly, and finally after boiling with 2 per cent. sulphuric acid.—*Ibid.*, from *Deutsch. Zucker. Ind.*, 1882, p. 388.

Estimations of Ash.—The tedious operation of the estimation of

ash in flour, wine, beer, extracts, etc., may be much facilitated by perfecting the combustion of the previously carbonized residue in a current of oxygen. The oxygen apparatus may consist of a test-tube, in which is placed a mixture of potassium chlorate and manganese dioxide, and the upper portion of which is filled with glass-wool, in order to prevent the escape of dust-like particles. The oxygen is conveyed through the perforated lid of a Rose crucible, the latter being first heated, and finally the test tube. As soon as oxygen passes over, a violent combustion is produced, and the ash is very soon burned to whiteness.—*Ibid.*, p. 474, from *Pharm. Centralhalle*, 3, p. 188.

Reactions of Aloes. By Dr. Wilhelm Lenz.—By the examination of a number of specimens of authentic varieties of aloes, and a comparison of their reactions with those of extracts of rhubarb, senna, frangula bark and buckthorn berries, the author found that the reaction of Bornträger, appearance of a red coloration by the addition of ammonia to the benzin extract of the liquid, is not characteristic for aloes, as the other named substances, when treated in the same manner, also produce red colorations which cannot be plainly distinguished from those obtained with aloes. The behavior toward ferric chloride and iodinized potassium iodide, which Klunge has recommended, the author also considers unreliable for the detection of aloes. The reaction of Bornträger, which is attributed to the presence of aloetin, is also produced by chrysophanic acid, and the former and the latter, according to their reactions with solution of potassium hydrate and sulphuric acid (which produce first a red and then an orange coloration), and by fusion with caustic potassa, which is colored blue by both aloetin and chrysophanic acid, would appear to be identical.

Reliable results for the detection of aloes are obtained by the procedure of Dragendorff, which consists in the precipitation of the solutions by neutral acetate of lead, removal of the excess of lead by sulphuric acid, purification of the solution by agitation with ether, and extraction of the aloin with amylic alcohol. In the residue obtained by the subsequent evaporation of the amylic alcohol the aloes may be detected with certitude; the corresponding residues from rhubarb, senna, frangula bark and buckthorn berries are much smaller in amount and show none of the reactions which characterize aloin.—*Ibid.*, p. 475, from *Ztschr. Anal. Chem.*, 21, p. 220.

Potassio-bismuthic Iodide as a Reagent for Alkaloids. By F. Maugni.—In the course of a forensic examination the author observed that the above-named reagent, as recommended by Dragendorff on account of its sensitiveness, and which he had prepared according to the Russian method, gave also with pure water a turbidity. It was then prepared by the author, by the admixture of 3 parts of potassium iodide, 16 parts of bismuth iodide, and 3 parts of hydrochloric acid. When prepared in this way it gave no turbidity with water, was very sensitive, and permitted even, what has been refuted by Dragendorff, the discrimination of the individual alkaloids by means of the color and behavior of the precipitate.—*Ibid.*, No. 25, 1882, p. 494, from *Gazz. Chim.*, 12, p. 155.

Detection of Sodium Salicylate in Milk.—Girard mixes 1 liter of milk with 1 liter of warm water, then adds 5 drops of acetic acid, filters, and agitates the liquid with ½ liter of ether; the ether is then decanted, and allowed to evaporate spontaneously. If salicylic acid were present, the residue gives with one drop of a 1 per eent. solution of ferric chloride a violet coloration.—*Chem. Ztg.*, 6, p. 385, from *Giorn. Farm. Chim.*, 31, p. 124.

The Constituents of the Cola Nut, Gourou or Ombene (seeds of Sterculia acuminata, Pal. de Bavois).—Heckel and Schlagdenhauffen have submitted the cotyledons of the cola nut to analysis, with the following result. 100 parts were found to contain:

Caffeine,	2·348	Substances soluble in chloroform.
Theobromine,	0·023	
Tannin,	0·027	
Fatty matter,	0·585	
Tannin,	1·591	Substances soluble in alcohol.
Cola red,	1·290	
Glucose,	2·875	
Fixed salts,	0·070	
Starch,	33·754	
Gum,	3·040	
Coloring matters,	2·561	
Protein substances,	6·761	
Ash,	3·325	
Water,	11·919	
Cellulose,	29·831	
	100·000	

This analysis shows that the cola nuts are richer in caffeine than the most esteemed varieties of coffee, and that this base is contained

therein in a perfectly free state, not combined, as in the coffee, with an organic acid; they contain also an appreciable quantity of theobromine, which increases the properties of the caffeine and acts syngenetically with this active principle. It is also an important fact that they contain a notable quantity of glucose, of which cacao contains no trace; the quantity of starch is also thrice that contained in the seeds of theobroma, which explains their nutritive value; the amount of fatty matter, however, is very slight, compared with that contained in the cacao. There exists further a special variety of tannin, which resembles caffeo-tannic acid, and a red coloring matter (cola red) very closely related to that denominated by Payen as cacao red. The physiological examination of this seed has shown that its unique action depends upon the caffeine and theobromine which it contains.—*Rep. de Pharm.*, 1882, No. 4, p. 463.

On the Gloriosa superba. By C. J. H. Warden.—The roots of Gloriosa superba, an Indian plant of the natural order Liliaceæ, when collected before the period of flowering possess a deep yellow color. The author has isolated from the aqueous extract of the root a bitter principle, which is denominated *superbin.* It is obtained by extracting the alcoholic extract with water acidulated with acetic acid, neutralizing the liquid by carbonate of sodium, filtering, acidulating with sulphuric acid, and precipitating by tannin; the precipitate treated with lime, dried, and extracted with alcohol, yields to the latter the superbin.

The superbin which, moreover, does not present the characters of a definite principle, is an energetic poison. The author advances the hypothesis of its identity with the poison of Scilla maritima.—*Jour. de Phar. et de Chim.*, 1882, p. 523, from *Ber. d. Deutsch. Ch. Ges.*, 14, p. 1111.

On Conicine and its Compounds. By J. Schorm.—The author, having had occasion to prepare considerable quantities of conicine, has made several observations upon the preparation, and has succeeded in obtaining in a crystalline form a certain number of salts of the alkaloid in question.

The procedure of preparation which appears to be the best is the following: The fruits of hemlock are moistened with hot water, and, after having been allowed to swell, are treated with a little carbonate of sodium; the caustic alkalies must not be employed. For 100 kilograms of the fruit 4 kilograms of carbonate of sodium are employed,

and, after having rendered the mixture homogeneous by prolonged agitation, it is distilled by the aid of steam, under a pressure of about 3 atmospheres. The distillation is continued as long as the distilled liquid has an alkaline reaction.

From the obtained product the cicutine separates in an oily condition when ripe fruits have been employed, and more fluid when derived from less mature fruits. It is then neutralized by hydrochloric acid, evaporated to the consistence of syrup, the residue agitated with twice its volume of strong alcohol, and the precipitated chloride of ammonium separated. After the removal of the alcohol by means of a water-bath an equivalent quantity of caustic soda is added, and the mixture agitated with ether, which dissolves the impure conicine. Under the influence of energetic refrigeration the ethereal liquid separates long needles of conhydrine. The last-mentioned principle passes over by distillation with ether, and may be thus collected, while the conicine remains behind.

Another method of preparation consists in exhausting the fruits with water acidulated with acetic acid, and in evaporating the extract in a vacuum to the consistence of a syrup. To the product magnesia is then added, and the whole agitated with ether. By this method a little less alkaloid is obtained, but it is more pure, and yields more readily crystallizable salts.

By the two methods the alkali which remains after the distillation of the ether is dried by carbonate of potassium, and distilled from an air-bath; 10 parts in 100 pass over between 110° and 168°C., 60 parts in 100 between 168° and 169°C., which is the pure conicine, and 20 parts in 100 between 169° and 180°C.

Pure conicine is colorless and remains colorless by exposure to light. Its specific gravity is 0·886. It dissolves in the cold one quarter of its weight of water, and liberates the same again on heating; it is itself soluble in 90 parts of water.

The author has studied, in connection with other chemists, the *hydrochlorate* and *hydrobromate of conicine;* these two salts are anhydrous, isomorphous, and crystallize in right rhombic prisms.

The *hydriodate of conicine* is anhydrous; it can only be obtained crystalline with perfectly pure hydriodic acid, which is entirely free from iron. This salt crystallizes, by slow evaporation, in large flat needles, unalterable by exposure to light and air. It also forms oblique rhom-

bohedral prisms. When gently heated in a vacuum it sublimes similarly to sal ammoniac.

The *acid tartrate of conicine* is obtained by the combination of the calculated amount of base and acid; by the spontaneous evaporation of its solution it forms right rhombohedral prisms, containing two molecules of water of crystallization.

The *neutral oxalate of conicine* forms indeterminable crystals, in mamillated groups, and contains no water of crystallization.

The author has also obtained a borate, carbonate and picrate of conicine, and double salts with sulphate of aluminium and chloride of zinc, but these compounds have not been analyzed.—*Ibid.*, pp. 526 to 528, from *Ibid.*, 14, p. 1765.

NOTE ON THE CINCHONA ALKALOIDS.

By O. Hesse.

About the middle of March in last year I discovered in the mother liquor of homocinchonidine sulphate a new alkaloid which presents several points of resemblance to homocinchonidine as well as to cinchonidine, but differs from both those alkaloids, especially in its behavior towards potassium permanganate in acid solution ("Pharm. Jour." [3], vol. xii, p. 179). In consequence of a communication from Forst and Böhringer ("Berichte," xiv, 1270), I subsequently reported upon this investigation and indicated that the *hydrocinchonidine* of Forst and Böhringer was probably identical with my alkaloid and that it might exist in the cinchonidine described by those chemists as chemically pure ("Berichte," xiv, 1685).

The investigation in this direction of actually pure cinchonidine, afterwards undertaken by me, gave not the least trace of hydrocinchonidine, whilst commercial cinchonidine from different sources yielded it in varying quantities, and further showed that, in respect to its properties, hydrocinchonidine agreed perfectly with the alkaloid to which I had given the name "cinchamidine" ("Berichte," xiv, 1893").

The only remaining distinction between hydrocinchonidine and cinchamidine was therefore to be sought in the respective formulæ, $C_{19}H_{24}N_2O$ and $C_{20}H_{26}N_2O_2$. This difference may, however, be of no importance, as I have been informed on good authority that the hydrocinchonidine was not analyzed, but in assigning to it a formula they were guided by other considerations.

The fact that I was able to obtain the alkaloid in question very easily and in a different manner, without the use of potassium permanganate, as I shall show in a detailed communication that will appear shortly, induced me to test also, in this direction, cinchonine, conchinine[1] and quinine in different stages of their preparation.

With cinchonine, this investigation did not yield any satisfactory result, which I believe may be attributable to the fact that in the cinchona barks used by me in the manufacture of quinine, cinchonine, etc., *hydrocinchonine*, or the base resisting the action of potassium permanganate, occurs at most only in traces, so that certain evidence of the pre-existence of this substance (or substances) would be an impossibility. On the other hand, I was able to ascertain the occurrence of hydrocinchonine in a bark described as "china cuprea," but which was not suited to the manufacture in question. The composition of this base corresponds to the formula $C_{19}H_{24}N_2O$.

	Calculated.	Found.
C, . .	77·02 per cent.	76·93 per cent.
H, . .	8·11 "	8·17 "

The properties of this base do not correspond to those which Caventou and Willm, as well as Skraup, observed in hydrocinchonine; the crystals of my hydrocinchonine melted on the contrary at 256°C. (uncorr.) Further, the acid chloroplatinate of this base, differing from the corresponding platinum salt of the hydrocinchonine discovered by Caventou and Willm, forms a yellow amorphous powder, having the composition $C_{19}H_{24}N_2O,PtCl_6H_2+2H_2O$. Whether these differences are only accidental or dependent upon the substance itself must evidently be ascertained by further investigation.

The results obtained in subjecting the sulphates of conchinine and quinine to oxidation were less favorable than in the case of cinchonine.

At present my observations on cinchamidine have enabled me to separate from the mother-liquors of conchinine and quinine sulphates fractions which in the one case were rich in hydroconchinine and in the other in hydroquinine.

Hydroconchinine was found by me to have a composition corresponding to the formula $C_{20}H_{26}N_2O_2+2\frac{1}{2}H_2O$. It forms readily efflorescing prisms, which melt at 168°C. (uncorr.) and dissolve freely in hot alcohol and chloroform and less freely in ether. The solution of the

[1] The alkaloid referred to by the author under this name is that commonly called quinidine.—Ed. P. J.

base in dilute sulphuric acid shows a blue fluorescence, whilst in a solution in hydrochloric acid this property could not be observed. These solutions, upon the addition of chlorine and an excess of ammonia, gave a dark green color.

The neutral sulphate crystallizes in delicate colorless crystals,[1] which have a great resemblance to the crystals of conchinine sulphate. When tested in the same way as conchinine with potassium iodide the same result is obtained. On the other hand its solution in dilute sulphuric acid differs from that of conchinine sulphate in its resistance to potassium permanganate.

With respect to *hydroquinine* the composition of the substance dried at 120° C. corresponds to the formula $C_{20}H_{26}N_2O_2$.

	Found.	Calculated.
C, ...	73·93	73·63
H, ...	7·96	7·97

Hydroquinine is precipitated by ammonia from the blue fluorescent solution in dilute sulphuric acid in white amorphous flocks, which immediately become crystalline. The water of crystallization in the air-dried base amounts to 7·75 per cent., though in well-formed crystals a higher amount might be found. The alkaloid melts at 168°C. (uncorr.), dissolves freely in alcohol and ether, and upon the evaporation of the solutions is left behind in an amorphous form. It exhibits with chlorine and excess of ammonia the same reaction as quinine, but resists the action of potassium permanganate for a longer time.

The acid platinum salt, $C_{20}H_{26}N_2O_2,PtCl_6H_2+2H_2O$, is thrown down as an amorphous yellow precipitate, afterwards becoming crystalline.

The neutral tartrate, $(C_{20}H_{26}N_2O_2)_2,C_4H_6O_6+H_2O$, forms colorless prisms, which dissolve very sparingly in cold water, but to a greater extent than crystals of neutral tartrate of quinine.

The neutral sulphate, $(C_{20}H_{26}N_2O_2)_2,SO_4H_2+H_2O$, crystallizes in colorless needles, sparingly soluble in cold water. In acid solution, under otherwise similar relations, it rotates the beam of polarized light less strongly than quinine sulphate. At t=15° and p=4° (anhydrous sulphate) it gave, in aqueous solution containing four mols. HCl, $(\alpha)_D=$ —222·5°, which would give for hydroquinine under these conditions, $(\alpha)_D=255·9$.

[1] The neutral sulphate of Forst and Böhringer's hydroquinidine (hydroconchinine) forms thick crystals with numerous planes, and is consequently not identical with my sulphate.

I cannot conclude this communication without first briefly referring to two other cinchona alkaloids.

The first is *homoquinine,* which was found simultaneously in cuprea bark by D. Howard and J. Hodgkin ("Phar. Jour." [3], xii, 528.), B. H. Paul and A. J. Cownley ("Ibid." [3], xii, 497), and G. Whiffen ("Ibid." [3], xii, 497) (see "Am. Jour. Phar.," 1882, p. 75). According to Herr J. A. Tod, who observed the alkaloid as far back as the autumn of 1880, this bark contains it very frequently, often to the extent of nearly 0·3 per cent.

For the material used in my investigation I am indebted to Herr Tod, who occasionally obtained it in his examinations of cuprea bark. The substance was purified by repeated recrystallizations from ether. When dried at 120°C. its composition corresponded to the formula $C_{19}H_{22}N_2O_2$.

	Calculated.	Found.	
C, . . .	73·54	73·67	73·16
H, . . .	7·09	7·35	7·09

Homoquinine crystallizes from ether containing water, partly in flat prisms and partly in laminæ. The former contain 2 molecules of water of crystallization, the latter apparently only 1 molecule.

		Calculated.	Found.		
Prisms,	$2H_2O$,	10·44	10·88	10·40	10·00
Scales,	H_2O,	5·49		6·54	

Homoquinine melts at 177°C. (uncorr.); it dissolves freely in alcohol and chloroform, and sparingly in ether, from which it crystallizes in proportion as it can take up water. If dehydrating substances are present, it can appareutly only be obtained amorphous. It dissolves in dilute sulphuric acid with blue fluorescence, and with chlorine and excess of ammonia is colored exactly the same as quinine.

Homoquinine gives with several acids easily crystallizable salts, the aqueous solutions of which yield with potassium iodide only a resinous precipitate. Its sulphuric acid solution immediately decolorizes potassium permanganate.

The neutral tartrate crystallizes in colorless needles, which are sparingly soluble in cold water.

The neutral sulphate, $(C_{19}H_{22}N_2O_2)_2,SO_4H_2+6H_2O_D$, crystallizes in short prisms, which are very sparingly soluble in cold water and readily effloresce. (Found 12·50 and 13·37 per cent. H_2O; calculated 13·07 per cent.) Since in respect to solubility in water this salt resembles almost exactly quinine sulphate, the possibility is not excluded that it

may also be present in the quinine sulphate of commerce. Nevertheless, for the detection of homoquinine sulphate in quinine sulphate, the process given in the German Pharmacopœia for the testing of quinine is quite useless. On the contrary Liebig's ether test has proved to answer, if a little more ether be taken.

The acid chloroplatinate is obtained as a yellow crystalline precipitate having the composition $C_{19}H_{22}N_2O_2,PtCl_6H_2+H_2O$. (Found 26·11 per cent. Pt and 1·95 per cent. H_2O; calculated, 26·42 per cent. Pt and 2·43 per cent. H_2O.)

The second alkaloid that I wish to mention is *cincholine*. If Rochelle salt and sulphocyanide of potassium be added successively to the mother-liquor first obtained in the preparation of quinine sulphate, until the latter no longer produces a precipitate, the light yellow solution supersaturated with caustic soda, and the alkaloid set free extracted by shaking the liquor out with ether; the ether leaves upon evaporation a brown mobile residue having a peculiar odor. Upon boiling with water the volatile bases present pass off from this residue, and can be suitably collected in dilute hydrochloric acid. This solution is then evaporated, the residue mixed with caustic soda solution and extracted with ether. After the ethereal solution has been repeatedly washed with water, solution of oxalic acid in ether is added to it drop by drop, and the cincholine oxalate is precipitated as a pasty mass, which quickly changes into shining laminæ.

Cincholine, separated from the oxalate by means of caustic soda, is a pale yellow oil, having a strong basic reaction, lighter than water, and with a faint peculiar smell. It dissolves freely in ether, alcohol and chloroform, less so in water, and scarcely at all in soda solution. It can be distilled, especially in the vapor of water, is not colored by chloride of lime, and dissolves freely in hydrochloric acid, which it is capable of neutralizing. The neutral solution is tasteless, and upon evaporation the hydrochlorate separates in colorless, mostly four-sided scales. With gold and platinum chlorides it gives only resinous precipitates. Cincholine forms with oxalic acid a salt very sparingly soluble in water.

So far at present upon this base. In a future communication I propose to refer to the composition of this body, which may, perhaps play some part in the formation of quinine. For we find this body, so far as my experience goes, only in such barks as contain quinine.

The mixture of volatile alkaloids, obtained as above, when purified

through a single distillation, possesses an odor recalling somewhat that of chinoline. I have already previously called attention to a similar smelling constituent of cinchona bark ("Berichte," x., 2162). Possibly chinoline, which is known to stand in very near relation to cinchonine, also occurs in cinchona barks.—*Phar. Jour. and Trans.*, May 6, 1882; *from Berichte d. deutschen chemischen Gessellschaft*, xv., 854.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

Alkaloids of Aspidosperma Quebracho.—Hesse has isolated six alkaloids from the bark of quebracho blanco (see "Am. Jour. Phar.," 1881, p. 169); but some specimens of the bark contain only three. The mixed alkaloids are obtained by boiling the bark with alcohol, distilling off the alcohol, adding excess of caustic soda and extracting with ether or chloroform; the solvent is evaporated, the residue treated with dilute sulphuric acid, the red-brown solution filtered and precipitated with soda.

Aspidospermine, $C_{22}H_{30}N_2O_2$, is obtained from the mixed alkaloids by dissolving them in warm dilute acetic acid, adding to the warm solution ammonia so long as a precipitate becoming immediately crystalline results, and filtering at once. Or the mixed alkaloids are dissolved in a little boiling alcohol, when on cooling aspidospermine and quebrachine crystallize together and are separated by treating the alcoholic solution with hydrochloric acid and evaporating to crystallization, when aspidospermine remains in the mother liquor, is precipitated by ammonia and purified from hot alcohol or ligroin (boiling between 70° and 120°C.) The alkaloid crystallizes in pointed prisms or delicate needles of dazzling whiteness, melts at 205° to 206° C., a small portion subliming, is rather freely soluble in absolute alcohol, less freely in ether, ligroin and petroleum benzin, and freely in benzol and chloroform. It is lævogyre, contains no water of crystallization, has no effect on litmus paper or on ferric chloride, and yields with platinic chloride a blue precipitate and with perchloric acid on heating a fuchsine red, but never a blueish solution. The solution in concentrated sulphuric acid is colorless, even in presence of a little molybdic acid, and yields with potassium bichromate a red-brown color, changing to dark-green.

Aspidospermine does not neutralize acids and is partially withdrawn

from its salts by ether, chloroform and other solvents. The neutral and acid sulphate and oxalate, the hydrochlorate and acid citrate are amorphous and have an acid reaction ; a bibasic citrate does not exist, a portion of the alkaloid crystallizes and the amorphous mass, afterwards left, contains 1½ mol. of alkaloid to 1 mol. of citric acid.

Aspidospermatine $C_{22}H_{28}N_2O_2$ is the principal alkaloid left in the alcoholic mother liquor of the total alkaloids. The acetic acid solution is reprecipitated by sodium bicarbonate, then treated with small quantities of ammonia as long as a flocculent precipitate (*of aspidosamine*) is formed, filtered, mixed with caustic soda and shaken with ether ; the ether is evaporated and the residue boiled with a little ligroin (*hypoquebrachine* is left undissolved), when on cooling, besides amorphous substance, warty aggregations of crystals of aspidospermatine are left, requiring purification from hot ligroin. The alkaloid is freely soluble in alcohol, ether and chloroform, melts at 162°C., has a strong basic reaction and bitter taste, and is lævogyre. It behaves like aspidospermine towards perchloric acid and sulphuric acid, but the latter solution is not colored by a little potassium bichromate. Its salts are amorphous, brown or yellow.

Aspidosamine, $C_{22}H_{28}N_2O_2$, is purified by precipitation with ammonia from acetic acid and by boiling with a little ligroin. It is at first colorless, but in the light becomes yellowish or reddish. It is amorphous, very freely soluble in ether, chloroform, alcohol and benzol, melts at about 100°C., and has a bitter taste and strongly alkaline reaction. In aqueous solution of chloral hydrate it is colored red-brown by ferric chloride ; it dissolves in sulphuric acid, with a blueish color (blue in presence of molybdic acid), the color being changed to dark-blue by a little potassium bichromate ; the solution in perchloric acid is fuchsine-red. The hydrochlorate is brown, brittle and easily soluble in cold water.

Hypoquebrachine, $C_{21}H_{26}N_2O_2$, after being purified in acetic acid solution with animal charcoal, is yellowish and has an odor resembling chinoline which disappears on gentle heating, the alkaloid becoming brown. It melts near 80°C., dissolves freely in alcohol, ether and chloroform, tastes bitter and forms yellow amorphous salts, which are freely soluble in water and give with ferric chloride a splendid cherry-red color. The solution in perchloric acid turns fuchsine-red upon boiling ; that in sulphuric acid is at first colorless, but quickly becomes

of a violet color, and this is more intense in the presence of molybdic acid.

Quebrachine, $C_{21}H_{26}N_2O_3$, crystallizes as hydrochlorate from its solution with aspidospermine. The alkaloid forms delicate colorless needles, which slowly turn yellow in sunlight. It dissolves freely in boiling and little in cold alcohol, is slightly soluble in ether and ligroin and easily soluble in chloroform. It is dextrogyre, strongly basic and bitter, and is not colored by ferric chloride. The solution in perchloric acid becomes yellow upon heating; that in sulphuric acid becomes bluish in a few minutes and of a splendid blue color on the addition of lead peroxide, molybdic acid or potassium bichromate, the color with the chrominum salt passing after some time to red-brown.

The salts are crystallizable. The neutral sulphate, $(C_{21}H_{26}N_2O_3)_2SO_4H_2+8H_2O$, forms large cubes or short prisms, is freely soluble in boiling water, but with difficulty in alcohol. The neutral oxalate is in needles, anhydrous and extremely insoluble in alcohol and water. The neutral tartrate contains $6H_2O$, forms satiny tables and scales and is freely soluble in cold water, but slightly so in alcohol. The bibasic citrate and the hydrochlorate are sparingly soluble in cold water and alcohol, but more freely in hot water. The hydriodate is resinous, uncrystallizable and easily soluble in alcohol and water.

Quebrachamine was observed once in the alcoholic mother liquor, from the purification of aspidospermine and crystallized from the solution in hot alcohol, mixed with a little hot water. The colorless satiny scales melt at 142°C., dissolve freely in alcohol, benzol, chloroform and ether, have a basic reaction, and an intensely bitter taste. The alkaloid dissolves in caustic alkalies, is not colored by ferric chloride and dissolves in sulphuric acid with a blueish color, and dark violet in the presence of molybdic acid or potassium bichromate. The solution in perchloric acid, upon boiling, becomes yellowish, then yellowish-red and on cooling, turbid.

The six alkaloids in doses of 0·01 to 0·02 gm. produce in frogs paralysis of the motor apparatus, first of the respiratory muscles, as well as the other muscles of the system, whilst the sensibility remains intact for a long time. Four alkaloids (hypoquebrachine and quebrachamine were not tested) produce in frogs quickly an increasingly important slackening and finally a cessation of the heart-beats.

On exhausting the powdered bark with ether, chloroform or petroleum benzin, evaporating the solvent and treating the smeary residue

with boiling alcohol, upon cooling, crystals of an alcohol-like substance are obtained which has been named *quebrachol;* it is lævogyre, melts at 125°C. and has the formula $C_{20}H_{34}O$.—*Phar. Jour. and Trans.*, March 25, 1882, p. 781–785; from *Ann. d. Chemie*, ccxi.

Loxopterygium Lorentzii, Grisebach, nat. ord. Terebinthaceæ. The bark of quebracho colorado contains a considerable amount of tannin, and is used in its native country for tanning purposes. The wood, as its name implies, is of a red color and is used in the preparation of an extract. O. Hesse found in the wood minute quantities of two alkaloids which may be obtained together by the process for preparing the alkaloids from white quebracho. One of the alkaloids is precipitated from the acetic acid solution by potassium sulphocyanide, and, after decomposition by soda and agitation with ether, acquires with dilute sulphuric acid a magnificent blue color, which is evidently due to a body produced by oxidation.

The second alkaloid, *loxopterygine*, may be precipitated by ammonia, is in white amorphous flocks, freely soluble in ether, alcohol, chloroform, benzol and acetone, has a strong basic reaction, tastes intensely bitter, is not colored by ferric chloride and dissolves in nitric acid with a blood-red color. The solution in sulphuric acid is yellowish, and in the presence of molybdic acid or potassium bichromate blue or violet. The solution in perchloric acid, upon warming, becomes brown-red. The alkaloid melts at 81°C., and quickly decomposes at a higher temperature. Its composition is probably $C_{26}H_{34}N_2O_2$. From 6 kilograms of the wood only about 0·5 gm. of the alkaloid could be obtained.

Dr. Hesse calls attention to the chemical relation of the alkaloids contained in quebracho blanco, and that nearly related thereto are the alkaloids *paytine* and *paytamine* which more than ten years previously were obtained by him from a bark then unknown, but since recognized as from a species of Aspidosperma. The close relationship of this genus to Strychnos explains why the Aspidosperma bases present in their reactions a certain similarity to the Strychnos bases, likewise in their physiological action, although the former are less powerful in their action than the latter, especially curarine. A certain degree of caution in the use of these bases is undoubtedly required. For the mixed alkaloids the designation *quebrachetum* is proposed, in analogy to "quinetum," used for the mixed cinchona alkaloids.—*Phar. Jour. and Trans.*, April 1, p. 807–809; from *Ann. d. Chem.*, ccxi.

Rhubarb cultivated at St. Petersburg has been assayed by F. Beil-

stein. The roots were six years old from both Rheum officinale and Rh. palmatum. The dried, peeled and powdered root was exhausted with benzol, this solution distilled and the resulting extract boiled with soda solution; the solution, after cooling and filtering, retained only emodin, which could be precipitated by hydrochloric acid, while the undissolved chrysophanic acid was purified by repeated crystallization from alcohol and from 70 per cent. acetic acid. The highest yield was obtained from Rh. palmatum grown in a sandy moorland, and gave one per cent. of the crude mixture, one-fourth of which was emodin, and the remainder chrysophanic acid. The root of the same species grown in clayey soil yielded only half per cent. of chrysophanic acid, with very little emodin. A like yield was had from Rh. officinale, but the product contained only uncertain traces of emodin.

The rhubarb used in Russia is now imported from England; the author, however, thinks it may be advantageously cultivated also for exportation.—*Phar. Zeitschr. f. Russl.*, 1882, No. 16.

Storax and sulphuric acid yield under certain circumstances white needles nearly insoluble in ether (see "Amer. Jour. Phar.," 1881, p. 251), for which Mylius proposes the provisional name *styrogenin*. Several other crystalline compounds, which are, however, more freely soluble in ether, are produced at the same time. The composition of styrogenin appears to be $C_{26}H_{40}O_3$. It is sparingly soluble in alcohol, benzol and benzin, somewhat more soluble in hot toluol and amylic alcohol, very freely soluble in chloroform, in which solution on the addition of bromine, substitution compounds are produced. It dissolves in cold sulphuric acid without alteration; but on warming an orange-red liquid is formed from which water precipitates an uncrystallizable resin, soluble in ether. Styrogenin may be obtained from that portion of storax which is dissolved by boiling petroleum benzin; but it is not produced from styracin or storesin.—*Phar. Centralh.*, 1882, p. 79 to 81.

Aconitic acid was found by A. Behr (1877) in the juice of the sugar cane and in crude sugar. H. B. Parsons has established its presence also in the juice of the sorghum; the scale from sorghum sugar pans was found to be impure calcium aconitate, $CaHC_6H_3O_6.H_2O$.—*Amer. Chem. Jour.*, iv, No. 1.

Free acid in fresh cows' milk was observed by Dr. C. Arnold. The milk had a peculiar unpleasant, somewhat acrid taste, was free from uncombined volatile fatty acids, but contained ·80 per cent. of a peculiar fat acid, the nature of which was not determined, nor was the

cause for the presence of the free acid ascertained.—*Arch. d. Phar.*, 1882, April, 291 to 293.

Copper in Grain and Flour.—J. Van den Berghe found in the ash obtained from a million parts of grain and of flour from 8 to 11·1 parts of copper, and the same amount also in bread.—*Chem. Zeitung*, 1882, March 16, p. 223, from *Mondes*, lvi, 209.

PRACTICAL NOTES FROM VARIOUS SOURCES.

By the Editor.

Aluminium palmitate is a resin-like compound which melts at a higher temperature than dammar and copal, and is readily soluble in oil of turpentine and benzol, a solution in 5 parts of the solvent being still thick and varnish-like. K. Lieber states that it makes an excellent varnish, which dries readily, remains permanently pliable and has a handsome silky lustre, which is increased by the addition of copal and dammar. It is insoluble in water, does not penetrate through paper and seems to be well adapted for extensive use in the arts.—*Zeits. Oest. Ap. Ver.*, 1882, p. 38; *Dingl. Polyt. Jour.*, vol. 240, p. 243.

Liquor Aluminii acetatis.—Prof. Poleck reports the following process which has been adopted for the German Pharmacopœia: 300 parts of aluminium sulphate are dissolved in 800 parts of water and mixed with 360 parts of acetic acid. To this solution is gradually added precipitated calcium carbonate 130 parts, previously triturated with 200 parts of water. The mixture is set aside for a day and occasionally stirred, then strained, the precipitate pressed and the liquor filtered. The filtrate weighs 1277 parts, has the density 1·0455 to 1·0457, and contains 7·69 to 7·76 per cent. aluminium acetate, $Al_2(C_2H_3O_2)_4(OH)_2$, ·23 to ·47 per cent. Al_2O_3 and ·33 per cent. $CaSO_4$. It is clear, colorless, has a faint acetic odor, and after the addition of 2 per cent. potassium sulphate, when heated in a water-bath, gelatinizes, but after cooling slowly becomes limpid and clear again.

Dr. Vulpius recommends the use of very capacious and shallow vessels in making this preparation. The precipitated calcium sulphate is very voluminous, but parts with the enclosed solution readily by a gradually increased pressure.—*Archiv d. Phar.*, April, 1882, p. 257–269.

Saccharated soluble Ferric Oxide.—Dr. Brunnengraeber has fur-

nished the following formula for the new German Pharmacopœia: Dissolve powdered sugar 9 parts in water 9 parts; add solution of ferric chloride (sp. gr. 1·280 to 1·282, containing 10 per cent. iron) 30 parts; afterwards gradually and with continued stirring, a solution, prepared with heat and allowed to cool, of sodium carbonate 24 parts in water 48 parts. When the evolution of carbonic acid gas has ceased, add gradually caustic soda solution (sp. gr. 1·159 to 1·163, containing 15 per cent. of NaOH) 24 parts. When clear, add to the liquid sodium bicarbonate 9 parts and dilute at once with boiling water 600 parts, set aside, remove the clear liquid with a syphon, mix the precipitate twice with boiling water 400 parts; after subsidence syphon off the liquid; finally collect the precipitate upon a moist strainer, wash it with hot water until the filtrate is not precipitated, but merely rendered opalescent with silver nitrate, and express. Mix the precipitate in a porcelain dish with powdered sugar 50 parts, evaporate in a steam-bath to dryness, stirring constantly, and triturate the residue with sufficient sugar to make the weight equal to 100 parts.

It in a red-brown powder of a sweet ferruginous taste, contaius 3 per cent. of iron and yields with 20 parts of hot water a clear red-brown solution which is not altered by potassium ferrocyanide, but on the further addition of hydrochloric acid yields at first a dingy green, afterwards a blue precipitate. If 2 grams of the powder are ignited, the residue treated with boiling hydrochloric acid, the filtrate oxidized with potassium chlorate and heating, and the cold liquid mixed with 1 gram of potassium iodide, and digested for an hour in a stoppered bottle, the mixture, in the presence of a little solution of iodide of starch, must require from 10 to 10·7 cc. of tenth normal solution of sodium thiosulphate to combine with the separated iodine.—*Arch. d. Phar.*, April, 1882, p. 289–291.

Albuminated ferrous borotartrate is recommended by Carlo Pavesi as an antiseptic and antifermentative and as possessing sedative properties. It is prepared by mixing in a porcelain dish finely powdered boric acid 1 part and tartaric acid 1 part with iron filings 2 parts and sufficient water to form a liquid. The mixture is gradually heated to 212°F., and then allowed to cool. Fresh egg albumen 6 parts is now added and the whole well mixed until it is reduced to a homogeneous mass, which it set aside for a week at a temperature not exceeding 76°F., and occasionally stirred; it is then filtered and the filtrate evaporated below 95°F. to dryness, and powdered.

It is a light straw-colored powder of a not disagreeable taste, inodorous, soluble in water, and the solution is not precipitated by alkalies, but yields black precipitates with tannin and potassium sulphide, and a blue precipitate with potassium cyanide; strong acids separate the boric acid and albumen.—*Phar. Jour. and Trans.* April 22, p. 864; *Annali di Chimica.*

Mercurial Peptones.—The following normal solution of mercuric peptone is prepared by E. Delpech: Dissolve peptone in powder 9 grams, ammonium chloride 9 grams and corrosive sublimate 6 grams in distilled water 24 grams, filter and add glycerin 72 grams. The solution contains 5 per cent. of corrosive sublimate combined with peptone; since it is liable to precipitate after some time it should be prepared only in small quantities at a time. The precipitate, however, is free from mercury. The dry compound contains 25 per cent. of corrosive sublimate and may be employed hypodermically by dissolving it in water containing a little glycerin.

For internal use a solution of dry mercuric peptone 1 gram in distilled water 200 grams and glycerin 50 grams may be used in place of Van Swieten's liquid, and is given in doses of a teaspoonful, equal to ·005 gram of corrosive sublimate, diluted with a little water or milk. —*Jour. Phar. Chim.*, Feb., 1882, p. 151, 152.

Mercuric Iodide and Sodium Hyposulphite.—J. M. Eder and G. Ulm found that 1 molecule of mercuric iodide requires 2 molecules sodium hyposulphite for solution. On standing, warming, or evaporation in vacuo the liquid gradually deposits a precipitate varying in color between yellowish and vermilion-red and containing mercurous iodide, sulphide of mercury and sulphur, the latter being partly insoluble in carbon bisulphide. The precipitate turns black in the light. The solution probably contains a double salt $HgI_2(Na_2S_2O_3)_2$. —*Wien. Anz.*, 1882, p. 37.

For disguising the odor of Iodoform Dr. Puetz employs oil of mirbane (nitrobenzol), 6 drops of which are sufficient for 1 gram of iodoform.—*Phar. Zeitung*, April 1.

Aqueous solution of Iodoform is prepared by Dr. Schadewald as follows: A large glass flask is filled to about one-third with distilled water and for each liter capacity 2 grams of iodoform are added; the flask is closed with a plug of cotton and heated for about 30 minutes to between 80 and 90°C. Violet-colored iodoform vapors are produced; that these vapors are not iodine may be proven by condensa-

tion upon a cold glass rod. The liquid is slowly cooled and filtered, yielding a bright golden-yellow filtrate which contains between ·5 and ·7 per cent. of iodoform.—*Phar. Zeitung,* April 15, 1882.

Solubility of Iodoform.—Dr. Vulpius, in several communications, published in "Archiv der Pharmacie," gives the following information: Hot glycerin dissolves 1 per cent. of iodoform, more than one-half of which separates on cooling. Hot olive oil takes up about 20 per cent. of iodoform, of which 2 per cent. remains in solution after cooling. The solution in chloroform rapidly becomes dark red, probably in consequence of a mutual reaction between the two compounds. With collodion a 10 per cent. solution of iodoform can be readily prepared by agitating the latter with a little ether and afterwards with the collodion, and even a 15 per cent. solution may be made. At the ordinary temperature, 100 parts of the following liquids dissolve of iodoform the amounts indicated:

Petroleumbenzin 1 part, benzol 1·5 part, absolute alcohol 4 parts, oil of turpentine 4 parts, oil of lavender 7 parts, oil of cloves 8 parts, oil of fennel 9 parts, oil of lemon 9 parts, oil of rosemary 9 parts, oil of cinnamon 14 parts, oil of caraway 16 parts, ether 16 parts.—*Archiv der Phar.*, Jan, 1882.

Iodoform Pencils for fistulas are prepared by triturating together finely powdered iodoform and butter of cacao, of each 2 grams, and rolling the mass out into five pencils of 2 millimeters thickness, which are dusted with lycopodium.—*Phar. Centralhalle,* 1882, p. 193.

Woelfer's Iodoform Gauze.—Dissolve 60 grams of rosin in 1,200 grams strong alcohol and add 50 grams of glycerin; soak in this liquid 6 meters of gauze deprived of fat, express, and when about half dry dust upon it 50 grams finely-powdered iodoform.—*Ibid.*

Iodoform Toothpaste for application to exposed nerves is recommended by Schaff on account of its anæsthetic and mild caustic properties, without producing irritation or inflammation.

It is prepared by triturating powdered iodoform and kaolin, of each 4·0 grams, carbolic acid 0·5 grams, oil of peppermint 10 drops with sufficient glycerin.—*Ibid.* p. 147.

Preparation of Atropine.—1,000 grams powdered belladonna leaves are exhausted by displacement with 84 per cent. alcohol; the tincture is distilled and the extract treated with five times its volume of water; the aqueous solution is filtered from the resin and fat, evaporated to 300 cubic centimeters, mixed with an excess of ammonia, and the

excess allowed to evaporate by exposure. The liquid is now agitated with ether which is absolutely free from alcohol, and the etherial solution well shaken with a small quantity of water containing a little acetic acid; the acetic solution is treated with animal charcoal, concentrated by evaporation and again treated with ammonia and ether on the spontaneous evaporation of the etherial solution the atropine is left in nearly white very fine crystals, which are obtained white by recrystallizing once or twice.—*Chem. Centralbl.*, 1882, p. 180.

The reddening of Carbolic Acid is not always caused by light, but may take place in the dark, and rosolic acid is not always found in the reddened acid. Ammonium nitrite produces with carbolic acid a red color which gradually changes to yellow, brownish green, olive-green, finally to a dingy bluish gray.—*Phar. Zeitung,* April 12, 1882.

The detection of mineral acids in Vinegar is readily effected, according to Chiappe, by a 0·1 per cent. solution of methylaniline-violet, the color of which is not altered by organic acids, while even largely diluted mineral acids change the color to ultramarine-blue.—*Chem. Zeitung,* March 23, 1882, p. 244; *Giorn. Farm. Chim.*, xxxi, p. 76.

Artificially-colored Claret is not unfrequently met with. According to C. Thomas, Bordeaux red, a new coal-tar product, has been used for coloring, and its presence may be detected by immersing for six or eight minutes raw unsized silk in the warmed wine, the natural coloring matter of which will dye the silk of a violet-pink color, changing to green by ammonia, or, if old wines are tested, to greenish, while Bordeaux red will impart an intense red color, changing to brown by ammonia. Burnt alum assumes with the natural claret a grayish violet, but in the presence of Bordeaux red a red color.—*Rép. de Phar.*, 1882, p. 64.

Another method depends upon the recognition as sulphate of the sulphur contained in the Bordeaux red: 100 cc. of claret is mixed with an excess of baryta, the filtrate freed from barium by ammonium carbonate, evaporated and ignited; the ash is treated with dilute hydrochloric acid and the filtrate tested with barium chloride. 0·5 gram Bordeaux red in 1 liter of claret produced a distinct precipitate.—*Rép. de Phar.*, 1882, p. 64, 111.

SOME REMARKS UPON MODERN PHARMACEUTICAL STUDY.

By H. J. Möller.

(Continued from page 323.)

Holland.

This country holds a very peculiar position with regard to pharmaceutical study, and also with regard to several other pharmaceutical conditions. During a journey through Holland, in the spring of this year, I had the opportunity to get a superficial view of Dutch pharmacy and to collect the laws and other information of which I had need. I owe many thanks to Professor Van der Burg, in Leyden, for the kindness with which he has answered my letters and procured me every further explanation I desired.

"Wet van den 25sten December, 1878, houdende regeling der voorwaarden lot verkrijging der bevoegdheid van arts, tandmeester, apotheker, vroedvrouw en apothekersbediende,"[1] is the Dutch title of the Pharmacy Act by which the rules for pharmaceutical study have been lately fixed in a quite peculiar way. I shall here translate only the most important parts of this law which by a "Besluit van den 12den Februarij, 1879," was enforced August 1, 1879.

Art. 1. The title of physician is acquired by the *practical medical examination*, which is fixed in article 2.

Art. 3. This practical examination can only be passed by those students who have already passed *the two examinations in the natural sciences* and the *theoretical* medical examination.

Art. 4. *The first examination in natural science* embraces natural history, chemistry and botany. In order to pass this examination it is required that the candidate (1) shall have passed the pass examination between the fourth and fifth classes in a "gymnasium," with a course of six years; or (2) shall have been in the highest class of the "pro-gymnasium;" or (3) shall have passed the final examination in a higher "burgerschool," with a course of five years. (This examination is also necessary for a pharmacist.)

Art. 5. *The second examination in natural science* contains anatomy, physiology, histology, pathology, therapeutics and materia medica; it is only passed by physicians, and the same is the case with the theoretical medical examination, which is fixed in article 6.

Art. 11. The title of "Apotheker" gives the right to practise pharmacy, and is obtained through *the practical pharmaceutical examination*, which demands proof of sufficient knowledge in analysis and pharmacy. Before the candidate can be admitted to this examination he must have been an apprentice in a pharmacy at least two years.

Art. 12 demands that before the *practical* pharmaceutical examination the *theoretical* shall be passed.

In accordance with article 13 this last mentioned examination embraces pharmacy, toxicology, and analytical chemistry.

[1] "Law of December 25, 1878, containing the order of the conditions for admission as a physician, dentist, pharmacist, midwife and 'apothecary-servant.'" This law is published in "Staatsblad van het Koningrijk der Nederlanden," No. 222, 1878.

Art. 15. The right to be admitted to the *theoretical* pharmaceutical examination belongs to those candidates only who have passed the first examination in natural science (see article 4).

Art. 17. Those only can be "Apothecary-servants" (in Dutch, "Apothekers-bedienden"), with the same rights as the earlier "Hulpapotheker" (*i. e.*, assistants), who are at least eighteen years old, and have passed an examination which has shown that they possess sufficient knowledge, and are practised in preparing medicine after prescriptions.

Art. 18 determines that the practical examinations (see articles 2, 8 and 11) shall be passed before a special board of examiners.

Art. 20 determines that the examination of the "apothecary-servants" shall be passed before another special board of examiners.

The import of these somewhat complicated rules is, in a few words, the following: The young man who in Holland desires to study pharmacy or medicine can choose whether he will receive his preliminary education in the classical school or in a higher "burgerschool." Then he must receive a practical education of at least two years with a pharmacist (or a physician, if he is studying medicine), and passes now "the *first* examination in the natural sciences" (common for both, see article 4). The medical student passes then a *second* examination in the medical branches of natural science especially (see article 5). Now they both pass the *theoretical* examination of their respective professions (see articles 6 and 13), and finally their respective *practical* examinations (see articles 2 and 11).

By this the complete equality of pharmacy and medicine is shown. To make the analogy complete, some so-called "apothecary-servants" are placed under the pharmacist, in the same way as the "chirurgeons" and sick-watchers assist the physician in the less important point of attendance upon patients. These "apothecary-servants" can of course never manage or possess a pharmacy. Another peculiarity in the Dutch pharmacy is the frequent education of *female* apprentices, which arrangement is found very satisfactory in Holland; January 1st, 1879, Holland had altogether 259 pharmaceutical apprentices (called in Dutch "Leerling"), and of these 48 were female.

According to the explanations which Professor Van der Burg has been so kind as to give me, the examination of the Dutch pharmacist includes forensal and quantitative analysis, as well as microscopical study of the pharmaceutical drugs and their adulterations. The *theoretical* part of the examinations is held at the universities (in Leyden, Utrecht, Groningen and Amsterdam); the *practical* part is passed before a special Government Commission, which is changed every year. Having passed his examinations the pharmacist can establish himself when and where he will.

The "apothecary-servants" do not frequent the universities, and there is no government institute which is established particularly for their education. In Amsterdam there is a special school, connected with the industrial school of the city, where "apothecary-servants" can obtain education if they wish it, and a society for the development of pharmacy ("Rotterdamsche Departement van de Maatschappij te bevordering der Pharmacie") is at present (June, 1880) occupied with the establishment of a similar school in Rotterdam.

(To be continued.)

VARIETIES.

Mouth Washes.—Dr. W. Herbert Rollins, in the Boston "Med. and Surg. Journal," gives the following as examples of mouth washes. The use of carbolic acid alone, or in combination with an alkali, can seldom be resorted to, because patients associate it with unpleasant places. Benzoic acid, thymol, eucalyptus oil, or boracic acid, answer the purpose, and some one of them is generally agreeable to the patient.

1. ℞	Sodæ boratis, . . .	15 grams.
	Thymol, . . .	200 milligrams.
	Aquæ, . . .	1,000 grams.—M.
2. ℞	Sodæ boratis, . . .	15 grams.
	Olei eucalypti, . . .	2 grams.
	Magnesii carbonatis, . .	4 grams.
	Aquæ, ...	1,000 grams.—M.

Rub the oil with the magnesia, add the water gradually, having dissolved the borax in it, then filter and mark the filtrate mouth wash.

The patient should hold the wash in the mouth for at least a minute, forcing it constantly in and out through the spaces between the teeth, to bring the fluid in contact with the points of decay, changing their reaction from acid to alkaline, and washing out the debris collected about the necks of the teeth and in the spaces between them.

Distribution of Alcohol in Nature.—According to A. Müntz, alcohol is formed in the soil and in waters by the decomposition of organic substances, and its vapor ascends into the atmosphere, whereupon, through meteoric influences (rain, etc.), it again finds its way to the earth. Its presence therein may be readily proved by means of the iodoform test, particularly when such fluids are previously subjected to distillation and the portion tested which first distils over.—*Compt. Rend.*, xcii, p. 499.

MINUTES OF THE COLLEGE.

A stated meeting of the Philadelphia College of Pharmacy was held at the Hall on Monday, June 26, 1882.

The President being absent, Charles Bullock, Vice President, occupied the chair.

Eleven members were in attendance.

The minutes of the annual meeting were read and, on motion, adopted.

The minutes of the Board of Trustees since March last were read by William C. Bakes, Secretary of the Board, and, on motion, approved.

These minutes inform the College of the election of the following gentlemen as members, viz.: Messrs. George M. Beringer, Benjamin S. Gilbert,

Andrew G. Frey, Clarence T. Smith, Mahlon Kratz, and Charles C. Drueding.

The three delinquent members reported at the last meeting of the College being still in arrears, their names were, on motion, ordered to be stricken from the roll.

The resignation of Andrew Blair, as a member of the Board of Trustees, was read and accepted, and, on motion of Wm. B. Webb, the vacancy in the Board was directed to be filled at the semi-annual meeting of the College in September next.

The following gentlemen were elected delegates to represent this College at the annual meeting of the American Pharmaceutical Association, which will be held at Niagara Falls, on Tuesday, the 12th of September next, with power to fill all vacancies which may occur, viz.: Messrs. Alonzo Robbins, William McIntyre, Edward C. Jones, Robert England, and Dr. A. W. Miller.

As delegates to the Conference of the Schools of Pharmacy, which meets at the same time and place, the following gentlemen were elected, with power to fill all vacancies which may occur, viz.: Messrs. Charles Bullock, Prof. John M. Maisch, Prof. Joseph P. Remington.

Then, on motion, adjourned.

William J. Jenks, *Secretary.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

American Pharmaceutical Association.—The members of this Association are hereby notified that the Thirtieth Annual Meeting of this Association will be convened on Tuesday, September 12th, 1882, at 3 o'clock, at Niagara Falls, New York.

The time, the place, and the unusual attractions which will be afforded the visiting members will, beyond any doubt, make this one of the largest gatherings the Association has ever had.

The Local Secretary, Mr. Hiram E. Griffith, and the special committee on entertainment have perfected arrangements which will tend to the comfort and pleasure of visiting members, and which cannot fail to be an additional inducement to increase the attendance beyond previous years. These arrangements will be duly announced in a special circular to members, early in August.

The objects of the Association commend itself to the favorable consideration of every respectable pharmacist of our land, and it should have their hearty co-operation.

Its membership, now over 1,300, enrols a large number of our best pharmacists, and it seeks the addition of good pharmacists to its membership, that they may enjoy its privileges and benefits.

Blank forms of application for membership will be forwarded to all persons who desire them, and who will write to either the President, the Secretary, Prof. J. M. Maisch, Philadelphia, or G. W. Kennedy, Pottsville, Pa.

P. W. Bedford, *President.*

New York, June 20, 1882.

THE NEW YORK COLLEGE OF PHARMACY has begun to fit up the building recently purchased, adjoining the College, and will have a very complete Pharmaceutical Laboratory on the lower floor. It will be ready for students October 1st.

NEW YORK STATE PHARMACEUTICAL ASSOCIATION.—The fourth annual meeting was held in Albany, June 20th and 21st, with an attendance of about one hundred and fifty members. Dr. A. B. Huested, of Albany, read a valuable address of business, and historical interest. During the sessions one hundred and thirteen new members were elected. The reports of the several committees were of satisfactory character, and appropriate action was taken on them.

Amendmends to the constitution were offered, providing that the annual meetings shall be held at such time and place as the Association shall previously elect, and also that all routine and general business not of a scientific nature, and not otherwise provided for, shall be transacted by the Executive Committee, as also all business during the intervals between the annual meetings, they to report at each sitting of the Association, and their acts to be subject to the revision of the Association. The report of the Committee on Pharmacy Law explained the failure to secure the enactment of the law, and the Association voted that a Committee on Legislation be appointed, and that they present the law again at the next session of the Legislature. The Secretary was voted an annual salary of one hundred dollars, and the Treasurer was made a life member without payment of fees. On motion the following persons were elected honorary members: Prof. J. M. Maisch, Prof. Oscar Oldberg and Edward R. Squibb, M.D.

The papers read were: "Self-education for the young pharmacist—how can it best be accomplished, and what course of instruction is best adapted for this purpose," by Prof. P. W. Bedford. "On Fluid Extract of Wild Cherry," by Clay W. Holmes. On "Pill coating with gelatin," by Clay W. Holmes, and one entitled "The Pharmacist and his relation to Society," by Charles H. Scoville. They were all referred for publication.

The next annual meeting will be held at Ithaca, on the third Thursday of June, 1883. Mr. John B. Todd was elected local secretary. The officers of the association for the ensuing year are: President, A. B. Huested, Albany; Vice Presidents—W. H. Rogers, Middletown; C. Z. Otis, Binghamton; T. J. MacMahan, New York; Secretary, Clay W. Holmes, Elmira; Treasurer, C. H. Butler, Oswego; Executive Committee—F. L. Norton, Delhi; W. L. Dubois, Catskill; W. P. DeForrest, Brooklyn.

Delegates were elected to the American Pharmaceutical Association, and other delegations were appointed to attend the meetings of similar organizations in neighboring States.

The exhibition of objects of pharmaceutical interest was held in the hall above the one in which the sessions of the meeting were held.

The social features of the meeting were very attractive. Members visited the Capitol and Penitentiary, drives through the Park, and excursion down the river with music and collation were all duly enjoyed.

THE PENNSYLVANIA PHARMACEUTICAL ASSOCIATION held its fifth

annual meeting in the Opera House at Altoona, June 13th and 14th, the rear part of the hall being used for the display of exhibits.

President Kelly called the meeting to order a short time before 11 o'clock. Delegations from the Trade Association of Philadelphia Druggists, and from the Lancaster County and Reading Druggists' Associations, were received, and addresses of welcome were delivered by Hon. M. Howard, Mayor, and by Dr. Findlay, of Altoona. The medical profession of the city was invited to the courtesies of the floor. In his annual address, the President made various suggestions, which were referred to a committee of three for consideration and report; a like course was taken with the suggestions made by the Executive Committee. Dr. J. A. Miller read the Secretary's report, and Mr. J. L. Lemberger that of the Treasurer, showing a balance on hand amounting to $761.18.

The following officers were elected for the ensuing year: President, Alonzo Robbins, of Philadelphia; Vice-Presidents—J. B. Duble, of Williamsport, and Chas. H. Cressler, of Chambersburg; the Treasurer, Secretary and Executive Committee were re-elected.

At the second session delegations from the State associations of Ohio and West Virginia were received and welcomed, and committees were appointed on the next annual meeting and on the exhibition.

Mr. W. L. Turner read the report of the Committee on Trade Interests and Legislation, which was accompanied by the draft of a pharmacy law for the State, and this was ordered to be printed and to be considered at the morning session on the following day.

Dr. L. Wolff presented the report on adulterations and deteriorations, and from Mr. C. T. George was received the report on papers and queries.

The report on apprentices, read by Mr. W. B. Thompson, took strong ground in favor of a more thorough and systematic training of apprentices in all practical details of the business by their employers, and was warmly discussed by many members.

A report on county societies was made by Dr. Wolff, and the organization of other local associations urged.

At the evening session reports from the delegates to the National and various State pharmaceutical associations were received; also from a committee who had visited Washington in the interest of the repeal of the stamp tax, and a resolution was adopted urging upon Congress the abolition of the tax on matches, perfumery, bank checks, etc., and the reduction of the revenue tax on alcohol.

Two papers were read on the *preservation of essential oils*, one by Ch. A. Heinitsh, the other by J. W. Ridpath. Various methods were alluded to, and precautions were mentioned by means of which such oils may be kept in rather small bottles, excluded from the light and in a dark place.

Phosphorus pills was the title of a paper by A. Robbins. They are recommended to be made by rubbing 30 gr. of Tolu balsam with 70 gr. of wheat flour until reduced to a fine powder; a solution of 1 gr. of phosphorus in 1 fluidrachm of warm chloroform is then added, and the whole triturated until a pilular mass is obtained, which is rolled out and divided into the requisite number of pills. The pills may be moistened with a strong solution of tolu in ether, and rolled in liquorice root or other pow-

der; or, preferably, they should be gelatin coated. For this purpose R. H. Dimock's mixture ("Am. Jour. Phar.," 1879, p. 435), somewhat modified, may be used: Coxe's gelatin ℥i, acetic acid f℥xx, spirit of nitrous ether f℥xii, and oil of gaultheria ♏x. A mixture which dries more rapidly, and is to be used while hot, is made of gelatin ℥i, sugar ℥ss, and water f℥ii.

A paper by G. W. Kennedy gave the results of the analysis of ten samples of *cream of tartar* as sold by grocers. Only one sample was found to be unadulterated, but it contained about 14 per cent. of calcium tartrate. The remaining samples contained from 24 to 90 per cent. of adulterations, consisting of starch, chalk, gypsum, alum and terra alba, the latter being present in one sample to the extent of 60 per cent.

Dr. L. Wolff read a paper on *pumpkin seed.* He found the oil of the seed, extracted by petroleum benzin, to be destitute of tænifuge properties, to have a neutral reaction, to be insoluble in alcohol, and to consist of glycerides of oleic, palmitic and myristic acids; but the oil extracted by ether or chloroform acted as a tænifuge. The active principle is a resin, as has been previously pointed out by Haeckel, and may be obtained by exhausting the seeds, previously deprived of oil by petroleum benzin, with alcohol, ether or chloroform; it is greenish-brown, soft, has an acrid and bitter taste, and may be given as a tænifuge in doses of 15 grains in pill form. One or two fluidounces of the alcoholic fluid extract, given in the morning in broken doses and largely diluted, proved likewise efficient. The medicine should be followed in a few hours by a dose of castor oil, or by an emulsion prepared from one ounce of the seed. The electuary made by beating the decorticated seed into a pulp with sugar was found to be unreliable.

Resin of podophyllum was the subject of a paper by C. C. Klump, who found the resin prepared by the process of the pharmacopœia to be soluble in ether (specific gravity not given), with the exception of less than one per cent., which was partly soluble in alcohol. If prepared with the aid of alum, ether left an insoluble residue of over 20 per cent., and a nearly like amount was left by another sample; the insoluble portion did not act as a purgative in doses of two grains. The pharmacopœia process is regarded to be unexceptionable.

The valuable papers on *Pharmaceutical education*, by W. B. Thompson, and on *Beaumé's hydrometer*, by Gust. Pile, explaining the manner of constructing the instrument and the relation of the degrees to specific gravity, are not adapted for epitomizing.

A paper by Professor Maisch, on *The useful American myrtles*, is published on page 345.

A paper on *Percolation*, by W. M. Thomson, described the apparatus and process noticed by R. F. Fairthorne, on page 236 of our May number.

The fourth session, held on Wednesday morning, was mainly devoted to the consideration of the pharmacy bill, which was amended and referred back to the committee, with the instruction to endeavor to secure its passage at the next session of the legislature, and with power to further amend it if deemed necessary.

At the fifth session, held Wednesday evening, several of the above papers were read, and various amendments to the by-laws adopted. The salaries of the secretary and treasurer were increased to $100. The Executive Com-

mittee was empowered to invest any surplus funds in the hands of the treasurer. Applicants for membership are required to accompany their application with the admission fee and dues for one year.

A resolution offered by Mr. G. A. Kelly, favoring a duty of 10 per cent. on imported quinine, was passed.

Various committees and delegations to the American and several State Pharmaceutical Associations were appointed.

Resolutions of thanks were adopted, and at a late hour the Association adjourned to meet at Harrisburg on the third Tuesday of June, 1883, Mr. C. H. Boker having been elected Assistant Secretary. Over 100 new members were elected during the meeting.

Most of the members present and the ladies had an opportunity of visiting the extensive workshops of the Pennsylvania Railroad Company, and to enjoy the attractive scenery around the Mountain City. On Wednesday afternoon an excursion was taken by the narrow gauge railroad through the picturesque Bell's Gap to Valhalla, and on Thursday morning many of the visitors went by rail over the famous horseshoe to Cresson, inspecting the recently enlarged "Mountain House," and visiting the magnesia, iron and alum springs in the vicinity.

THE WEST VIRGINIA PHARMACEUTICAL ASSOCIATION held its annual meeting in the Senate Chamber at Wheeling on June 6th and 7th. In his annual address President S. Laughlin referred to some of the enemies of the pharmacy law in the Legislature and severely criticised their reprehensible conduct. Changes in the prices of staple drugs were mentioned and interesting information was given relating to the causes of fires in drug stores.

The treasurer reported a balance of $131.41 on hand.

The election of officers resulted in the choice of E. L. Boggs, Charleston, for President; C. M. Shrewsbury and Miller Iams for Vice Presidents; Chas. Moenkemoeller, Wheeling, for Secretary; R. T. Richardson, of New Martinsville, for Treasurer, and C. A. Potterfield for Local Secretary, the Association deciding to meet on June 7th, next year, at Charleston.

At the evening session various committee reports were read; also papers on the preparation of elixirs, by C. M. Shrewsbury, and on the use of the microscope in pharmacy and medicine, by Edward Rothlein.

At the third session the establishment of a College of Pharmacy was discussed by Dr. Colly Shriver, of Bethany, who was opposed to establishing such a college unless there was a fair prospect of its being entirely self-supporting.

A number of committees were appointed, and after transacting other routine business, the Association adjourned.

ORLEANS PHARMACEUTICAL ASSOCIATION is the title of a local society organized at New Orleans, La., June 5. Its officers are A. K. Finlay, President; R. J. Rivet and G. J. Mattingly, Vice Presidents; W. B. Gill, Secretary; C. L. Keppler, Corresponding Secretary, and W. Graner, Treasurer. The meetings are held on the first Monday of each month.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Report of the Initiatory Proceedings of the Louisiana State Pharmaceutical Association at the meetings held at New Orleans, April 24, 25 and 26, 1882. New Orleans. 8vo, pp. 35.

An account of this meeting will be found on page 326 of our last number.

Compte rendu de la manifestation du corps pharmaceutique belge en l'honneur de Mr. Norbert Gille, president honoraire de l'Association générale pharmaceutique de Belgique, etc. Par E. Van de Vyvere. Anvers, 1882. 8vo, pp. 44.

This reprint from the Antwerp "Journal de Pharmacie" gives a full account of the manifestation of the Belgian pharmacists, including the speeches, in honor of Prof. Norbert Gille. This distinguished laborer in the interest of pharmacy was, at the University of Brussels, presented with his portrait, and subsequently a banquet was given in his honor.

Materia Medica and Therapeutics. Inorganic Substances. By Chas. D. F. Phillips, M.D., etc. Edited and adapted to the U. S. Pharmacopœia, by Laurence Johnson, A.M., M.D., etc. New York: Wm. Wood & Co., 1882. 8vo. Vol. I, pp. 298; Vol. II, pp. 340.

The volumes do not treat solely of inorganic substances as indicated upon the title page, but also of certain organic compounds, which are conveniently considered with others of strictly inorganic nature. Under the compounds of iodine iodoform is mentioned, and among the acids we find acetic, citric and tartaric acids, their salts being described under the respective metals.

The first volume is devoted to the non-metallic elements and their compounds, including the alkaline iodides and bromides, and concludes with the metals aluminum and antimonium, the remaining metals and their medicinal compounds being considered in the second volume in alphabetical order. In each case the chemistry is briefly given, followed by a more extended account of the medical properties under the headings of absorption and elimination, physiological action, including toxic properties and antidotes; therapeutical action, both external and internal preparations, dose and mode of administration. In this part the medical literature appears to have been thoroughly consulted and well used. The chemistry is necessarily brief, giving the mere outlines of preparation and the most important characters and tests, condensed from the British Pharmacopœia, the nomenclature of which is used throughout the work. In several cases, brevity in giving the characters is at the expense of clearness; thus it is stated of potassium nitrate that "at a red heat it deflagrates," and of potassium bichromate, that "the solution readily gives up part of its oxygen and when acidified with sulphuric acid, turns green from reduction of chromic acid and formation of green sulphate of chromium."

The Opium Habit; its successful treatment by the Avena sativa. By E. H. M. Sell, A.M., M.D. 8vo, pp. 8.

A reprint from the "Medical Gazette," describing results obtained with the *concentrated tincture of avena sativa*, which is claimed to contain the active principle of oats; from affidavits appended to the paper we learn that the so-called active principle is an alcoholic extract of oats, one ounce of which dissolved in ten ounces of alcohol produces the concentrated tincture.

A Contribution to the Subject of Nerve-stretching. By Wm. J. Morton, M.D. New York. 8vo, pp. 32. Reprinted from the "Journal of Nervous and Mental Diseases," January, 1882.

THE AMERICAN JOURNAL OF PHARMACY.

AUGUST, 1882.

JALAP AND POWDERED JALAP.

BY VIRGIL COBLENTZ, PH.G.

From an Inaugural Essay presented to the Philadelphia College of Pharmacy.

Commercial air-dry jalap of fair quality was examined.

1. Moisture.—5 grams of jalap, heated to 100°C. until it ceased to lose weight, lost ·388 gm. = 7·76 per cent

2. Ash.—5 grams of jalap, on incineration, yielded ·5508 gm. = 11·016 per cent. of ash, of which 55·29 per cent. was soluble in water, 38·23 per cent. soluble in hydrochloric acid, 8·82 per cent. soluble in soda and 17·64 per cent. insoluble. The ash consisted of sulphates, phosphates, chlorides and carbonates of potassium, sodium, calcium and magnesium, and silica.

3. Benzol Extract.—50 grams of jalap, exhausted with pure benzol, yielded 9·331 gm. = 18·62 per cent. of extract of a yellowish-brown color, a nauseous smoky odor and sweetish acrid taste; dissolved in absolute alcohol and the solution precipitated by water gave 8·035 gm. = 16·07 per cent. of resin and, on evaporation of the aqueous liquid, ·648 gm. of yellowish-brown sweetish extract, which contained sugar, was free from tannin and yielded a yellowish precipitate with basic lead acetate. The resin was ascertained to be insoluble in oil of turpentine, sparingly soluble in petroleum naphtha and methylic alcohol, soluble in alcohol, amylic alcohol, chloroform and acetic acid. On being repeatedly dissolved in alcohol and precipitated in water, it became white and almost inodorous.

4. Resin.—On exhausting the resin with strong ether and evaporating, ·41139 gm. = 5·12 per cent. of a soft resinous mass was obtained, having a greenish-brown color, a disagreeable acrid taste and the peculiar odor of jalap; its alcoholic solution has an acid reaction; its solution in caustic alkali is red-brown and is precipitated by hydrochloric acid.

The resin insoluble in ether weighed 7·624 gm. = 94·88 per cent. Its alcoholic solution is neutral to litmus; its solution in potassa is bright yellow and is not disturbed on the addition of an acid. With nitric acid the resin evolves nitrous oxide and is colored bright yellow. Among the products of oxidation oxalic acid is found.

5. *Alcoholic Extract.*—The drug exhausted with benzol was treated with 80 per cent. alcohol; on evaporating the tincture 5·508 gm. = 11·016 per cent. of a red-brown tough extract was obtained; of this ·912 gm. = 16·5 per cent. was soluble in absolute alcohol and this portion had an acid reaction, reduced Fehling's solution, was free from tannin and was partly precipitated by subacetate of lead.

The portion insoluble in absolute alcohol was entirely soluble in water and was partly precipitated by basic lead acetate.

6. *Cold Water Extract.*—Cold water took up from the drug 2·59 gm. = 5·18 per cent. of extract, consisting of gum and coloring matter.

7. *Starch* was estimated by boiling the root with water, and this extract for a long time with dilute acid and calculating from the glucose; the amount was 3·6 gm. = 7·2 per cent.

8. *Alkali Extract.*—Boiling dilute soda solution dissolved 1·29 gm. = 2·58 per cent. of albuminous and coloring matters.

Powdered Jalap.—Twelve samples were assayed for the resin, which was found to vary from 3·8 to 16·2 per cent., the average being 8·1 per cent.; this resin was not further examined.

THE ROOT OF STILLINGIA SYLVATICA.

BY JOHN H. HARMANSON, PH.G.

Abstract from an Inaugural Essay.

The cold infusion of Stillingia is of a pale reddish color, possesses but slightly the odor and taste of the root, and yields precipitates with gelatin and ferric chloride, bluish-black with the latter; it is not disturbed by reagents for alkaloids, contains sugar, and the extract obtained on evaporation was partially soluble in alcohol.

The decoction, on the addition of iodine, became blue, but the color quickly disappeared at first. Stillingia root which had been completely exhausted with alcohol and ether showed the same behavior, but the decoction made from root which had been previously macerated in alcohol acidulated with sulphuric acid, gave a permanent blue color on

adding a minute amount of iodine. The property of decolorizing iodine is therefore regarded to be not due to tannin, and the principle as it exists in the root was found to be insoluble in alcohol and ether, slightly soluble in cold water, readily soluble in boiling water and destroyed by acids, gradually in the cold and rapidly on heating.

The ethereal tincture of the recently dried root left, on evaporation, a brownish extract of a very thick oily consistence, of a strong odor and of a persistently pungent and acrid taste; it was insoluble in water but quite soluble in stronger alcohol. The ethereal extract obtained from powder which had been exposed to the air for more than two years was considerably darker, thicker and but slightly pungent and acrid.

The tincture contains an oily and a resinous matter, the latter being soluble in ether and in alkalies and from the latter solution reprecipitated by acids. Rendered alkaline with potassa and distilled, an alkaline liquid was obtained which, on being neutralized with sulphuric acid and evaporated, yielded yellow crystals, and these by treatment with charcoal and recrystallization became white and odorless. The crystals are stated to yield precipitates with phosphomolybdic acid, tannin and Mayer's test, but not with chloride of gold.

On distilling the root with water, an opalescent distillate was obtained but no volatile oil. The root yielded about 5 per cent. of ash.

Guacamacha is a South American tree, related to the oleander, emitting, in the rainy season, when wounded, a very active milk juice. The activity resides in an alkaloid, which is chiefly contained in the bark, and to a certain extent in the wood, and is soluble in water, little soluble in absolute alcohol, and insoluble in ether and chloroform. The aqueous extract is an effective preparation. Dr. Schiffer states that it will probably prove a suitable remedy in diseases with increased action of the motor apparatus, and as a hypnotic. In Frerichs' clinic, a young man suffering from spasms had 0·010 gram injected, and after the stage of incubation, lasting nearly $\frac{3}{4}$ hour, in the daytime, slept soundly for three hours, and awoke without feeling the least disturbance; respiration and circulation were unaltered.—*Phar. Ztg.*, 1882, No. 45, from *D. Med. Ztg.*

ASTRINGENT DRUGS.

BY CHAS. F. KRAMER, PH.G.

From an Inaugural Essay.

For determining the amount of tannin, aluminated gelatin solution was employed; since, however, Müller's solution ("Amer. Jour. Phar.," 1859, p. 427; 1861, p. 164) proved to be too thick for convenient use, a solution of about one-third the strength proposed by him was used and standardized with tannin.

The author does not state the strength of the infusions or decoctions used, or whether the results were verified by check experiments. Most of the figures agree well with the results obtained by H. K. Bowman ("Am. Jour. Phar.," 1869, p. 193). The percentage of tannin thus determined was as follows:

Brayera,	24·40	Hæmatoxylon,	3·50
Caryophyllus,	13·00	Heuchera,	20·00
Catechu,	40·33	Humulus,	4·00
Chimaphila,	4·00	Krameria,	22·00
Cinnamomum,	9·36	Pimenta,	1·69
Cornus florida,	3·00	Prunus Virginiana,	3·42
Galla,	66·88	Quercus alba,	8·34
Geranium,	17·33	Rubus,	10·20
Geum,	3·00	Sassafras,	6·00
Granati Fructus Cortex,	28·00	Tormentilla,	17·00
Granati Radicis Cortex,	22·00	Valeriana,	1·54

EMULSION OF CODLIVER OIL WITH PHOSPHATE OF CALCIUM.

BY EVAN B. MERRIAM, PH.G.

From an Inaugural Essay.

Made by the following process, this preparation will retain the insoluble calcium phosphate in suspension for a long time:

Take of well-washed phosphate of calcium, dry and in fine powder,	grs. clx
Pure muriatic acid, a sufficient quantity, about	f℥v
Water of ammonia, a sufficient quantity, about	f℥iiss
Best codliver oil,	f℥viii
Pure glycerin,	f℥i
Gum arabic, in powder,	℥i
Oil of nutmeg,	♏v
Oil of lemon,	♏x
Oil of gaultheria,	♏v
Water, sufficient to make	f℥xvi

Dissolve the phosphate of calcium in the muriatic acid, dilute the solution with ten times its volume of water, and add the water of ammonia, also diluted with water, until it ceases to produce a white precipitate. Throw the whole on a filter, and wash as long as the washings render a solution of nitrate of silver turbid. To this precipitate, contained in a capsule, add the glycerin, and apply a gentle heat, until the mass is well diffused and the mixture becomes nearly clear; then remove, and mix it with the mucilage, and make the emulsion in the usual way.

The flavor of oil of bitter almonds, from its constant employment in this class of preparations, is repulsive to many persons, and the above mixture of oils is offered as a substitute therefor.

Preparations are sometimes sold under the names of codliver oil, lime, and iron and codliver oil and wild cherry. The former can be made by adding two grains of pyrophosphate of iron to each teaspoonful of the above emulsion; the latter, by shaking two ounces of the fluid extract of wild cherry bark with fourteen ounces of simple emulsion of codliver oil.

THE FORENSIC-CHEMICAL DETERMINATION OF GELSEMINE IN ANIMAL LIQUIDS AND TISSUES.

By Edward Schwarz, M.D.

Abstract from an Inaugural Essay presented to the University of Dorpat, and communicated by the Author.

The author briefly reviews the investigations of H. Kollock ("Amer. Jour. Phar.," 1855, p. 263), C. L. Eberle (*Ibid.*, 1869, p. 35), Professor Wormley (*Ibid.*, 1870, p. 1), and Dr. C. A. Robbins (see *Ibid.*, 1876, p. 191). Professor Wormley's more recent investigation (*Ibid.*, 1877, p. 150) appears to have escaped his attention. The method recommended by Dragendorff ("Jahresbericht für Pharmacie," 1878, p. 640) was used for the preparation of the two important principles; gelsemic acid was obtained from the acidulated solution by agitation with chloroform, and gelsemine by agitating the liquid rendered alkaline by ammonia with benzol.

The chloroform solution, on evaporation, left a crystalline residue, which dissolved partly in water, with a yellow color, and showed a strong blue fluorescence. The small insoluble portion was dissolved in alcohol. Both solutions, placed over sulphuric acid, yielded crystals;

those from the watery liquid were light yellow-brown fine needles, being comb-like, attached to a larger prismatic crystal. These crystals showed all the reactions of æsculin except that they acquired a greenish color with ferric chloride, due probably to the presence of æsculetin. The crystals from the alcoholic solution emanated from a central point, and were branching in a tree-like manner; in the deeper part of the vessel several thornapple-like aggregations of crystals were observed. The amount obtained from 50 grams of the root was so small that accurate investigations could not be made; moreover, the presence of æsculin seemed to interfere with the reactions of this substance.

The benzol solution yielded, on evaporation, a dark brown, resinous mass, which was dissolved in dilute sulphuric acid and precipitated with concentrated soda solution; the precipitate collected, washed and dried formed a white powder, which caked together in boiling water to a brown mass, and showed the behavior of gelsemine. The filtrate, agitated with chloroform, yielded a pale, rose-colored substance, having the same behavior. The total yield weighed between 0·2 and 0·3 gm.

Another experiment made with the powdered root proved that the acidulated liquid yields to amylic alcohol considerable æsculetin, recognizable by the dark green color with ferric salts, and by the blue-green fluorescence in aqueous solution, which is destroyed by potassa. The residue also gave distinct alkaloidal reactions with bismuth-potassium iodide, picric acid, and iodine.

The following tests were made with æsculin and æsculetin, not with the similar principle obtained from gelsemium.

To the well-known reaction of æsculin and æsculetin must be added their behavior to *Langley-Koehler's test*, which is very similar to that of picrotoxin,[1] except that the color with æsculin is deeper brown, and with æsculetin, red-brown. Æsculin and brucine have also a similar reaction, namely, to *chlorine water* (red color). *Gold chloride* is reduced by æsculin, the color depending on the concentration and temperature of the liquid; it yields, with aqueous solutions of æsculetin, a raspberry-red color. *Potassium ferridcyanide* does not affect æsculin, but, on boiling, colors æsculetin solutions red-brown. The same reagent, *with ferric chloride*, gives with both an intense green-blue

[1] Mix powdered picrotoxin with 3 or 5 parts of pure saltpetre; add 1 or 2 drops of strong sulphuric acid; mix, and add rapidly soda solution to strong alkaline reaction, when the mixture becomes transiently brick-red.
EDITOR.

color, and gradually causes a blue precipitate. Solution of *copper sulphate* remains blue with æsculin, but turns green with æsculetin.

A solution of 0·5 gm. æsculin in 50 cc. water was given to a cat without producing abnormal symptoms; the acid urine let after two hours had a strong fluorescence. Another cat took 0·1 gm. æsculin. The aqueous solution of the fæces of the first and second day was strongly fluorescent; from the third day, æsculin could not be detected. The urine was likewise fluorescent on three days, but not on the fourth day until after it was rendered alkaline; chloroform extracted from it æsculin.

Subcutaneous injections of æsculin, ·0066 and ·0003 gm., were made to two frogs, and these were afterwards placed in distilled water, which for nine days became fluorescent.

The author concludes, from these experiments, that

1. Æsculin is without decided action upon the animal organism.
2. It rapidly enters the second ways from the stomach and intestines.
3. It is not decomposed within the body, and
4. Is rapidly excreted through the kidneys.
5. A prolonged time is required for its complete excretion.
6. Powdered æsculin is partly eliminated with the fæces, probably owing to its sparing solubility.

The "animal quinine" obtained by Bence Jones from the kidneys of higher animals, which, however, has not been observed by Dragendorff, is not fluorescent in alkaline solutions.

The experiments with the alkaloid were made with such prepared by the author, and with pure gelsemine made by Merck. If merely moistened with sulphuric acid and then brought in contact with a minute drop of solution of potassium bichromate, the color produced and the changes closely resemble those observed with strychnine; but if as suggested, by Robbins, the alkaloids are dissolved in strong sulphuric acid, and the bichromate added to the solution, gelsemine yields a cherry-red color, changing to dingy gray-brown, and green spots or streaks are not unfrequently observed, due to absorption of moisture. Strychnine becomes violet-blue, then cherry-red, finally brick-red, the latter color lasting more than a day. Quebrachine becomes slowly violet-blue, and, after a longer time, acquires a red tint; but, if dissolved in trihydrated sulphuric acid, no reaction is observed with potassium bichromate, as is also the case with curarine; but under the same

condition the cherry-red color of gelsemine changes to an intense green or bluish-green.

On substituting manganese binoxide for the bichromate, almost identical results are obtained; but using concentrated sulphuric acid, the colorations of gelsemine, and particularly of quebrachine, are much darker and handsomer. With the bihydrated acid, quebrachine gives only a slight violet color; in the presence of trihydrate the dark green color of gelsemine appears slowly, and, with a greater dilution of the acid, the blue-violet color of strychnine in the beginning is more and more replaced by cherry-red.

The same reactions, made with ceric oxide, yield lighter and less intense colorations, the green from gelsemine having a bluish tint.

The weakest colorations are produced by lead peroxide only in presence of a trace of nitric acid; the tint from gelsemine is grass-green.

The reaction best adapted for gelsemine is sulphuric trihydrate and one of the four reagents, when the final color by gelsemine is green, and by strychnine, brick-red.

Concentrated sulphuric acid dissolves gelsemine with a yellow-brown color; quebrachine, similar; strychnine, colorless.

Sulphuric acid containing iron shows no reaction with gelsemine and strychnine; a blue-violet color with quebrachine.

Froehde's reagent: With gelsemine, roe-brown to red-brown, gradually yellowish-green (a very similar reaction was observed by Graebner with ptomaines); strychnine, no change; geissospermine and quebrachine, blue.

Selen-sulphuric acid, with gelsemine, no reaction.

Sugar and sulphuric acid: Gelsemine, cherry-red; but fats, biliary acids, aconitine, codeine, and delphinidine give the same color; strychnine, no red color; quebrachine, intense cherry-red.

Brouardel-Boutmy's reagent (potassium ferridcyanide and ferric chloride): Gelsemine and quebrachine, intensely green; strychnine and aspidospermine, no reaction. Ptomaines obtained from the stomach and intestines, no reaction; but if isolated from the liver, kidneys, etc., by agitation of the alkaline liquid with benzol or chloroform, a slight green color is produced, and the older the corpse the more frequently are such ptomaines obtained.

Chlorine water to acid solution: Gelsemine yields yellowish turbidity and slight fluorescence; after a while a yellowish-white precipitate, which is produced yet in solutions of 1 in 1,000 and is dark-

colored from impure alkaloid; the supernatant liquid is not fluorescent. Strychnine has a very similar behavior; likewise, though less delicate, quebrachine.

Boiling with perchloric acid: Gelsemine, slightly yellow; strychnine, red.

Sulphuric bihydrate, with fragment of potassium chlorate and boiling: Gelsemine and aspidospermine, clear; strychnine, red-brown to black-brown solution.

Selmi's reagent (iodic acid suspended in sulphuric acid): Gelsemine and strychnine, rose-colored; brucine and aspidospermine, brick-red; quebrachine, dark violet. On warming, the color becomes darker, and finally disappears.

Potassium-bismuth iodide gives a red-brown precipitate with ·000025 gm. gelsemine; phosphomolybdic acid, a precipitate with the same amount. Precipitates with ·00005 gm. gelsemine are caused by iodine, potassio-mercuric iodide, bromine (yellow), phosphotungstic acid (white), and tannin; with ·0001 gm. gelsemine, by potassio-cadmic iodide (white) and picric acid (yellow), and a turbidity merely by the chlorides of gold and mercury.

The author then refers to the physiological experiments made with gelsemium by Professor Ott (1875) and Dr. Moritz (1878), with whose results his own observations agree. He details his experiments for the detection of æsculin (gelsemic acid) and gelsemine, made with food, blood, and urine, both fresh and putrid, and with poisoned cats, and closes with the following deductions:

After poisoning with gelsemium in lethal doses, æsculin and gelsemine may be isolated by Dragendorff's method (removal of fat by petroleum benzin, extraction of æsculin from the acid solution by chloroform, and extraction of gelsemine from the alkaline liquid by benzol), and both may be recognized as such.

Æsculin may be found in all organs, and gelsemine in the stomach, intestines, blood, and liver.

After the subcutaneous application of rapidly fatal doses of gelsemine, the alkaloid can be detected in the corpse only in mere traces, and not with certainty; it is best to search for it in the liver.

Putrefaction, accompanied by alkaline reaction, does not alter gelsemine, but decomposes æsculin; both principles are not altered if the reaction remains acid.

The poisonous action of gelsemium does not depend on æsculin.

Gelsemine and æsculin rapidly pass from the stomach and intestines into the blood, and are excreted through the urine. The resorption is also rapid on subcutaneous application.

For the complete excretion of æsculin through the urine a longer time is required, so that after a single dose it may be recognized in the urine for several days.

If, in forensic analysis, gelsemine is supposed to have been found, the presence of æsculin should be determined for deciding the question whether gelsemine alone or gelsemium root had been administered.

Under certain conditions gelsemine shows the same reaction with sulphuric acid and potassium bichromate as strychnine. For distinguishing it from the latter, the following properties are useful:

I. The reactions. 1. To concentrated sulphuric acid; 2. To sulphuric trihydrate and potassium bichromate (or ceric oxide or peroxide of manganese or of lead); 3. To Brouardel-Boutmy's reagent; 4. To sugar and concentrated sulphuric acid.

II. The action upon the animal body; and

III. Its association in the root with æsculin.

It is distinguished from quebrachine, 1. By not being extracted by chloroform from acid solutions by the reactions; 2. With sulphuric acid and potassium trihydrate; 3. With Froehde's reagent; and 4. With sulphuric acid containing iron; and 5. By the absence of æsculin from quebracho bark.

The mode of isolation, the reaction with Froehde's reagent, and the association with æsculin in the drug serve to distinguish gelsemine from geissospermine.

For distinguishing it from aniline and curarine consult Dragendorff, "Ermittelung der Gifte." Relations analogous to those existing between strychnine on the one side and curarine and aniline on the other are likewise observed between gelsemine and the last two alkaloids.

J. M. M.

Solution of Morphine in Oil is proposed by Larochette to be prepared by dissolving 5 parts of the crystallized alkaloid in 1,000 parts of expressed oil of almond. Since dehydrated morphine is soluble in 125 parts of the hot oil such a concentrated solution may be kept on hand and properly diluted when wanted for medicinal use.—*Jour. Phar. Als.-Lorr.*, 1882, p. 105; *Bull. Phar. Lyon.*

CHEMICAL NOTES.

BY PROF. SAMUEL P. SADTLER, PH.D.

INORGANIC CHEMISTRY.—*On Pernitric Acid.*—Hautefeuille and Chappuis, who announced the fact, some time ago, that when the electric spark is passed through a mixture of nitrogen tetroxide and oxygen, the red color of the mixture disappears and a colorless gas remains, have still further investigated the matter. They find that the electric spark will develop the same compound from a dry mixture of oxygen and nitrogen gases. That the new compound is not nitric oxide, N_2O_5, is recognized by the fact that it cannot be gotten crystallized or in the solid form at all, as nitric oxide readily can be. They find, moreover, that this new compound forms up to a maximum amount from the action of the spark upon the mixture of gases, and after that the combination just made is broken up and nitrogen tetroxide and free oxygen remain. This maximum amount is dependent upon temperature, the lower the temperature the larger being the amount. They do not, as yet, propose any formula for it.—*Comptes Rendus*, 94, 1111.

On the Rare Metals of the Cerium and Yttrium Groups.—Roscoe has recently made a study of the mixture of rare earths from samarskite, with a view of determining whether De la Fontaine's philippium has any real existence or not. De la Fontaine had given, as one characteristic of the supposed element the fact that it formed a well-crystallized formiate distinct from that of terbium or yttrium. Roscoe finds that a mixture of the formiates of terbium and yttrium can crystallize in the single forms described as characteristic of philippium. He comes to the same conclusion with regard to the non-existence of philippium from a spectroscopic view of the several oxides, and from the standpoint of Mendelejeff's periodic system of the elements shows that an element is not to be expected in the position of philippium, and with the properties acribed to it.—*Ber. Chem. Ges.*, xv, p. 1274.

P. T. Clève publishes a note on didymium and a supposed new element which accompanies it. In purifying didymium preparations, he got fractions showing a variation in spectral lines, and giving for the atomic weight of didymium values varying from 146 to 142. The first of these he considers as pure didymium, and the last to be contaminated with an element yet to be isolated, which he designates provisionally as Diβ.—*Chem. News*, June 23, p. 273.

Processes for Direct Coppering of Castings of Iron and Steel.—F. Weil gives an account of the processes devised by him for the direct coppering of castings of iron and steel, without the use of any intermediate coating of plumbago or other material upon the surface of the casting.

The deposit of copper by this method is so homogeneous, and so faithfully reproduces the most delicate details of ornamentation, as to give to articles so coppered the artistic value of bronze, and at the same time is so firmly adherent that castings coppered by this process have remained exposed to the weather for ten years without requiring any retouching. The alkaline organic baths used in the process present several advantages over the ordinary alkaline baths used in electrotyping. The cyanides, which are both injurious to the health of the workmen and expensive, are replaced by organic acids, or by glycerin, both of which are cheap and have the advantage of not being decomposed in the operation. Thus the baths require no renewal of organic material, and act continuously, provided the necessary amount of oxide of copper is added from time to time. Finally the well-known property of alkaline organic solutions of dissolving oxide of iron easily and rapidly, without attacking the metal itself, always renders the cleansing of the castings perfect, as the bath finishes the cleansing of articles before coppering them.

The process is carried on in three different ways, according to local conditions and the different applications of the articles to be coppered. The first method consists in plunging the articles in the bath in contact with strips of zinc. The coppering begins immediately, and according to the alkalinity of the bath and the destination of the articles to be coppered, requires a variable time, from a few minutes to several hours.

The second process, which has been employed with great success for coppering the street lamps of a large city, consists in placing in the vessel containing the bath and the objects to be plated porous jars, filled with a strong solution of caustic soda, in which are placed plates of zinc, connected with the articles in the bath by a coarse copper wire. The time required for depositing a moderately-thick coating of copper, such as required by candelabra, etc., is very short.

The third process consists in the use of the same baths as in the first and second processes, in conjunction with a dynamo-electrical machine.

The baths, as has been said, only require the addition of a certain

amount of oxide of copper from time to time, and by a simple method of titration, also devised by Mr. Weil, the exact amount of copper oxide to be added can be readily and quickly determined.

These processes can be also applied to the deposition of all metals, such as nickel, cobalt, antimony, tin, etc., upon castings of iron and other metals.—*Comptes Rendus*, 93, 1018.

ORGANIC CHEMISTRY.—*On the Crystallization of Anhydrous Grape-sugar.*—Dr. Arno Behr describes the method of obtaining well-crystallized anhydrous glucose from aqueous solutions. Hitherto glucose had been obtained anhydrous only from alcoholic solutions, either solutions of ordinary alcohol, or, according to Soxhlet's recently-patented method, from methylic alcohol. From aqueous solutions had been obtained only the hydrate in small and laminated crystals, which were very hard to free from the mother liquor. Behr found that upon putting a crystal of anhydride in an aqueous solution, instead of its taking up water of hydration, there separated out over night a mass of hard, sharply-crystallized anhydrous glucose, which was readily purified from syrup in a centrifugal. The solution from which this crystallization took place contained 18 per cent. water, and of 100 parts dried material 87·5 were pure glucose. Behr found, moreover, that it was not even necessary to start the crystallization by a fragment of solid glucose, but that for concentrated solutions and moderately elevated temperatures, the crystallization of anhydride is the rule and not the exception. The pure product gotten this way resembles cane-sugar in many ways, and can be used for many of the applications of the latter. Its sweetness is to that of cane-sugar in about the ratio of 1 to $1\frac{2}{3}$.—*Ber. Chem. Ges.*, xv, p. 1104.

Artificial Piperine.—Rügheimer describes the successful attempt to build up the alkaloid piperine by the same methods as those adopted by Ladenburg in the preparation of artificial atropine. The action of phosphorus pentachloride upon piperic acid yielded the acid chloride, which was then made to act upon piperidine. The result of the reaction, freed from side products, was piperine, which after purification by recrystallization from benzol and ligroin fused at 127 to 128°C., and gave figures on analysis closely according with those demanded by the formula. Natural piperine, according to Rügheimer's observation, fuses at 128 to 129.5°C. In some text-books the fusing point of piperine is erroneously given on Pelletier's authority at 100 to 110°C.

The author promises still further experiments to establish the identity of the natural and the artificial alkaloids.—*Ibid.*, p. 1390.

On some New Compounds of Hœmateïn and Brazileïn.—Hummel and Perkin have studied purified hæmateïn and braziieïn, and have obtained some new coloring derivatives from them by the action of sulphuric, hydrochloric, and hydrobromic acids. They first obtained pure hæmateïn in glittering crystals of the formula $C_{16}H_{12}O_6$. They found it sparingly soluble in water, alcohol, ether and acetic acid; readily soluble in alkalies. It is destroyed by hot sulphuric acid, but dissolves readily in cold concentrated sulphuric acid, producing a dark reddish-brown solution. By adding hot glacial acetic acid very gradually to this solution, until it is diluted to two or three times its bulk, an orange crystalline precipitate is thrown down. This has the formula $C_{16}H_{12}O_6SO_3$, and is called by the authors sulphate of hæmatyl. By the action of hydrochloric acid, in sealed tubes, on hæmateïn, a body was prepared of the formula $C_{16}H_{11}O_5Cl$, crystallizing in scarlet needles. A similar compound, containing bromine, was prepared by the action of hydrobromic acid.

Brazileïn, as purified and dried at 100°C., had the formula $C_{16}H_{12}O_5$, H_2O, and yielded similar compounds by the action of sulphuric, hydrochloric, and hydrobromic acids. The tinctorial power of these new compounds is much greater than that of the original hæmateïn and brazileïn, and the colors are much faster. The authors consider that hæmateïn probably belongs to the class of phthaleïns.—*Chem. News*, June 23, 1882, p. 274.

On the Composition of Turmeric and some of its Derivatives.—C. Loring Jackson and A. G. Menke have made a careful study of curcumin, the yellow coloring matter of turmeric, and have established its formula by making a number of derivatives. They find for the preparation of curcumin the following to be the best method: The turmeric oil is first removed from the ground root by treatment with ligroin; then the curcumin, mixed with a large quantity of resin, is extracted with ether, and finally purified by crystallization with alcohol. The ligroin extract yielded on evaporation a dark yellow oil, amounting on the average to 11 per cent. of the weight of the root. The curcumin was purified by recrystallization until its melting point was 178°C. The average yield of this pure curcumin was 0·3 per cent. They give the formula $C_{14}H_{14}O_4$ to the compound, which formula seems borne out by the analysis of its derivatives. Of these, they pre-

pared the monopotassic and the dipotassic salt, the monoparabrombenzyl-ester, and several products of oxidation. With strong oxidizing agents, like sulphuric acid and potassium dichromate, they got only acetic acid and carbon dioxide, and with nitric acid they got chiefly oxalic acid. With mild oxidizing agents, like potassium permanganate and an alkaline hydrate, they obtained vanillin, melting at 79°C., when purified, and in another case ethylvanillic acid. They consider curcumin as a phenol-carboxylic acid, that is, a compound containing the phenol group OH and the group COOH, carboxyl, characteristic of organic acids.—*Amer. Chem. Jour.*, vol. iv, p. 77.

ANALYTICAL RESEARCHES AND INVESTIGATIONS.

COLLATED BY PROF. FREDERICK B. POWER, PH.D.

Examination of Butter for the Determination of Foreign Fats (oleomargarin).—Fifteen grams of the butter are introduced into a capsule and melted on the water-bath; after the water and impurities have deposited, the butter is carefully decanted and filtered upon a funnel placed with a small beaker in an oven, or with a funnel surrounded with hot water and, after filtration, the limpid butter refrigerated. The beaker is then weighed and by means of a glass rod three or four grams of the butter are removed and introduced into a capsule of twelve centimeters diameter, with the rod and butter adhering thereto; the beaker is then again weighed and the difference represents the weight of the butter; fifty cubic centimeters of alcohol and from one to two grams of pure potassa are then brought in the capsule, and the liquid heated upon the water-bath until when water is added, little by little, it produces no turbidity, which is generally attained by heating for about five minutes. If, on the sudden addition of a large quantity of water, a precipitation of flocks of fat are produced, it will be necessary to commence the operation anew.

The solution is evaporated on the water-bath to a syrupy consistence, the residue dissolved in one hundred to one hundred and fifty cubic centimeters of water, and the solution made strongly acid by dilute sulphuric acid; the whole is then heated on the water-bath for about half an hour, until the separation of the acids has become quite complete, and the aqueous liquid is absolutely limpid. A filter, ten to twelve centimeters in diameter, of paper sufficiently thick to admit of hot water passing through only drop by drop, is dried at 100°C. and weighed;

it is half filled with water and the contents of the capsule then poured upon it, being careful that the niveau of the liquid never exceeds two-thirds of the height of the filter. The capsule and the rod are then washed with hot water, which removes perfectly the fatty acids, after which the washing of these acids is continued on the filter until the washings have no longer an acid reaction; it requires about $\frac{3}{4}$ liter of water to attain this result, but no risk is involved of the fatty acids passing through the wet filter. After washing, the funnel is placed in cold water, and as soon as the acids have solidified the filter is dried at 100°C. in a tared beaker until the weight remains constant, which is attained in about two hours. In this way the weight of the non-volatile fatty acids, insoluble in water, is determined.

Butter yields by this procedure from 86·5 to 87·5 and sometimes 88 per cent. of fatty acids. The animal fats which serve for adulteration contain 95·5 per cent., consequently an excess of 95·5—87·5=8 per cent. by reason of the complete absence of soluble or volatile fatty acids. If, then, in analyzing a butter, it is found for the amount of acids a number exceeding 87·5, for example 91 per cent., being an excess of 3·5, it must be concluded that the butter is adulterated, and that it has received, as a minimum. an addition of $\frac{3\cdot5}{8\cdot}+100=43$ per cent of foreign fat. (See "Amer. Jour. Phar.," 1878, p. 257, 258.)

Determination of the Water.—Ten grams of butter are dissolved in thirty cubic centimeters of petroleum, having a specific gravity of 0·69 ann boiling at 80 to 110°C. The liquid which unites at the bottom is collected by the aid of a separating funnel and measured in a tube divided into tenths of a cubic centimeter; each division indicates 1 per cent. of water and of impurities; good butter contains from 10 to 14 per cent. of water; in this way one may recognize also the presence of substances slightly soluble in water, added for the purpose of adulteration, and the salt mixed with the butter for its preservation. The separated water contains also a portion of the dissolved foreign salts: alum, borax, soluble glass, etc.

The butter may also be dried at 110°C. and the product extracted by a light petroleum, boiling below 100°C. The residue consists of salt, the casein and lactose, the latter of which may be estimated by Fehling's solution. Butter is colored with curcuma or victoria yellow, with chromate of lead, yellow coralline, or the nitrous derivatives of saffron and annotto. In order to recognize the presence of these coloring matters it is necessary to make comparative reactions with the

butter to be examined with pure butter, and with butter to which the different coloring matters have been added.

The presence of salicylic acid may be detected by agitating the butter with warm salt water and adding to this liquid a drop of ferric chloride, when a violet coloration will be produced.—*Bull. de la Soc. de Pharm. de Bordeaux*, 1882, pp. 139–141.

On Hydroquinidine. By. C. Forst and Chr. Boehringer.—By the oxidation of quinidine by potassium permanganate, in a solution which is maintained acid, the authors have obtained a product of oxidation which is crystallizable from alcohol in small needles, while at the same time formic acid is produced, and a base crystallizable in prismatic needles, soluble in alcohol, and rapidly efflorescing on exposure to the air. The authors have determined simply the water of crystallization of this base, which they regard as *hydroquinidine*, $C_{20}H_{26}N_2O_2+2\frac{1}{2}H_2O$, and as produced during oxidation.

From its solution in ether this base is deposited in thick tables, which are apparently rhombic; its alcoholic solution has an alkaline reaction. Hydroquinidine is dextrogyrate and to about the same extent as quinidine; its fusing point is also about the same, being 166 to 167°C. It yields with chlorine and ammonia the reaction of quinine and quinidine, and its solution in dilute sulphuric acid presents a blue fluoreacence; its salts crystallize readily. The *chloroplatinate*, $C_{20}H_{26}N_2O_2(HCl)_2PtCl_4+2H_2O$, is deposited on cooling in short orange-colored needles. The *hydriodate* crystallizes in anhydrous striated needles, slightly soluble in cold water, and containing, according to the estimation of the iodine, $C_{20}H_{26}N_2O_2HI$. The *sulphate*, $(C_{20}H_{26}N_2O_2)_2H_2SO_4+12H_2O$, of which only the water of crystallization has been determined, forms voluminous many-faced crystals. The hydrochlorate forms short needles which are sparingly soluble in cold water.—*Ibid.*, p. 141; *from Ber. der Deutsch. Ch. Ges.*, xiv., p. 1954.

A Reaction of Morphine. By F. Tattersall ("Chem. News," 41, p. 63), and *Reactions of Morphine, Codeine, and Atropine.* By Diosc. Vitali ("Ber. der Deutsch. Ch. Ges.," 14, p. 582).—Tattersall has ascertained that morphine, when treated with sulphuric acid and arseniate of sodium, produces a violet color, which, by the action of heat, changes to green. Vitali, in order to effect this reaction, dissolves the morphine in concentrated sulphuric acid, adds the arseniate of sodium, and heats; a bluish-violet coloration is first observed and the liquid afterwards becomes green; by the addition of water to the latter, a

rose-colored solution is first obtained, which afterward becomes blue, and on the addition of ammonia in excess the green color is reproduced. The solution of morphine in sulphuric acid, on the addition of a little sulphide of sodium dissolved in water and heated, produces a rose-color which changes to violet and finally to a dark green; the same sulphuric acid solution of morphine with an alkaline sulphide, mixed with sulphuric acid to which chlorate of potassium has been previously added, produces a green and then a violet color, which changes to yellow on the addition of an excess of chlorate; codeine produces analogous reactions.

If to atropine the sulphuric acid solution of chlorate of potassium be added, drop by drop, and the vessel containing the mixture be agitated, there are developed greenish-blue stripes, and finally the liquid becomes slightly green.—*Jour. de Pharm. et de Chim.*, v, 1882, p. 633.

On the Volatile Oil of Sandal Wood. By P. Chapoteaut.—The volatile oil of sandal wood, which was formerly employed exclusively in the art of perfumery, has since found a therapeutic application by the replacement in part, if not completely, of balsam of copaiba.

It is obtained by distillation with the vapor of water from sandal wood (Santalum album, of Bombay). The yield of volatile oil from 100 kilos of wood varies from 1 kilo 250 grams to 2 kilos 800 grams, according to the more or less ancient origin of the wood.

The oil is a somewhat thickish liquid, having the specific gravity 0·945 at 15°C.; it boils between 300 and 340°C., and consists almost entirely of two oxygenated oils, having the composition $C_{15}H_{24}O$ and $C_{15}H_{26}O$, of which the first boils at about 300°C., the latter at about 310°C. The first is contained in the oil in much larger quantity than the second.

Action of dehydrating agents.—Phosphoric anhydride deprives the oil of two molecules of water, forming the hydrocarbons $C_{15}H_{22}$ and $C_{15}H_{24}$, of which the former boils at 245°C., the latter at about 260°C. The volatile oil of cedar, deprived of its oxygenated portion, possesses exactly the composition of the hydrocarbon, $C_{15}H_{22}$, and boils at the same temperature; it is thus probable that the two products are identical. As to the hydrocarbon, $C_{15}H_{24}$, it is isomeric, or identical with the oil of copaiba.

Action of heat.—By slow distillation the oil of sandal yields products boiling below 250°C. and above 350°C., at the same time form-

ing water and hydrogen, but the transformation is incomplete. By operating in a closed vessel, at 310°C., the reactions are more complete; the results obtained may be expressed by the two following equations, $4C_{15}H_{24}O = C_{20}H_{30}O + C_{40}H_{62}O_3 + 4H$, and $C_{40}H_{62}O_3 = C_{40}H_{60}O_2 + H_2O$.

The oil, $C_{20}H_{30}O$, boils at 240°C. Phosphoric anhydride transforms it into a hydrocarbon, $C_{10}H_{14}$, boiling at 175 to 180°C., and having the odor of thyme (cymene).

The product, $C_{40}H_{62}O_3$, is a thick liquid, distilling at about 340°C.

The third product, $C_{40}H_{60}O_2$, is found in the liquids boiling above 350°C., and has the consistence of honey.

The oil, $C_{15}H_{26}O$, must show the same deportment on heating, for in the products of decomposition of oil of sandal liquids are found boiling at 245 to 260°C., and by the dehydration of these oils hydrocarbons are obtained boiling at 185 to 200°C., of which the analysis corresponds to a hydrocarbon, $C_{10}H_{16}$, containing more hydrogen than cymene.

Action of acids.—On heating the oil of sandal, under pressure, at 150°C., with half its weight of glacial acetic acid, for 7 or 8 hours, a liquid is formed which boils between 280 and 300°C. It is a mixture of two products, of which one boils at 280 to 285°C., the other at 298°C.

The first has the formula $C_{30}H_{46}O$, and is the oil, $2C_{15}H_{24}O$, which has lost one molecule of water.

The second product is the acetic ether, $C_{17}H_{28}O_2$, of the oil, $C_{15}H_{26}O$. It possesses a somewhat fruity odor.

Hydrochloric acid produces, likewise, at 125°C., with the oil of sandal, an hydrochloric ether boiling at about 275°C., but the complete reaction is more complex than with acetic acid. The latter reactions the author considers as confirming the composition assigned to the oil of sandal, and demonstrate, moreover, that the oil, $C_{15}H_{26}O$, has the properties of an alcohol.

As to the second oil, $C_{15}H_{24}O$, which by its properties approaches the class of aldehydes, it is considered probable as being the aldehyde of the alcohol, $C_{15}H_{26}O$.—*Rép. de Pharm.*, No. 6, 1882, pp. 252–254.

A METHOD FOR THE ANALYSIS OF MUSTARD.

By Albert R. Leeds and Edgar Everhart.

So far as is known, there has been only one attempt made to analyze mustard by its separate constituents. Hassall, in his book on Food, its Adulterations and the Method for their Detection, proposes an analysis, partly direct and partly indirect. His method, and the results obtained by it, are those most quoted both in English and foreign books and journals.

His plan of analysis is as follows: The moisture and ash are determined as ordinarily, and the oil by extracting with ether. The myronate of potash is estimated by taking advantage of its well-known reaction with the myrosine contained in the mustard flour, in presence of water. Forty or fifty grains of the mustard are allowed to digest for twenty-four hours, with about 250 cc. of water in a well-corked flask. At the end of that time all the myronate of potash will have been decomposed by the ferment myrosine into glucose, sulphate of potash and mustard oil (allylthiocarbamide), according to the equation $C_{10}H_{18}KNS_2O_{10}=C_6H_{12}O_6+KHSO_4+C_4H_5NS$. The contents of the flask are distilled, and all of the allylthiocarbamide goes over with the water vapor. The end of the condenser dips below the surface of some strong ammonia water to prevent loss of the volatile oil. When no more oily drops come over with the distillate, the receiver and its contents are removed and allowed to stand until the allylthiocarbamide has combined with the ammonia, forming thiosinnamine ($C_4H_5NS.NH_3$). The solution is evaporated to dryness in a tared platinum dish, and from the amount of thiosinnamine found is calculated the myronate of potash.

So far the method is all that can be desired, but the remaining part is open to very serious objections. For the determination of the myrosine and sulphocyanide of sinapine, a combustion of the mustard is made with soda-lime for the total nitrogen, and another portion is fused with alkaline carbonates and nitrates, to estimate the total sulphur. As much nitrogen and sulphur as is contained in the myronate of potash is subtracted from the total nitrogen and sulphur, and from the two residues are calculated the amounts of myrosine and sulphocyanide of sinapine. The cellulose is estimated by difference.

The whole of the sulphur residue, and so much of the nitrogen as is necessary, are calculated into sulphocyanide of sinapine, and the

remaining nitrogen into myrosine. But as myrosine contains about 1·6 per cent. of sulphur, further calculations are necessary. Such calculations may or may not yield correct results, for one has as much right to calculate all the remaining sulphur first into myrosine, or all the nitrogen into either myrosine or sulphocyanide of sinapine, as the sulphur into the last-named compound. The results cannot be calculated algebraically because there is only one equation, and this equation has two unknown factors. In one of the samples of mustard analyzed by Hassall he finds myrosine 31·686 per cent., sulphocyanide of sinapine 5·714 per cent. Taking his percentages of nitrogen and sulphur, and calculating the total nitrogen first into myrosine, one finds myrosine 31·43 per cent., sulphocyanide of sinapine 3·95 per cent.

For the reasons above detailed, the following attempt was made to work out a method for the analysis of mustard, which should be direct throughout, and should rest on an actual separation and estimation of the several constituents. The moisture and ash are determined as usual. The mustard oil is extracted with ether in the following manner: A weighed portion of mustard, after drying at 105°, is carefully brushed into a plaited filter. The filter and its contents are placed in a funnel with straight sides. The stem of the funnel is connected by means of a well-fitting cork, with a small tared flask partially filled with ether, while the funnel itself is connected with an upright condenser. On cautiously boiling the ether, its vapor is constantly condensed, and, falling on the mustard, extracts the oil which is retained in the flask. When all of the oil is removed, the ether is distilled off, and the flask and contents, after drying at 100°, reweighed. The difference between the weight of the flask alone, and that of the flask and oil, gives the amount of oil. After the ether has evaporated from the mustard residue, a tared flask, containing half water and half alcohol, is substituted for that containing ether, and the contents are boiled and condensed as before. The dilute alcohol dissolves both the sulphocyanide of sinapine and the myronate of potash, while it coagulates the myrosine, and leaves both it and the cellulose undissolved. After all the sulphocyanide of sinapine and myronate of potash have been extracted, the contents of the flask are rinsed into a tared platinum dish, evaporated to dryness, dried at 105° and weighed. The dish and contents are then ignited and weighed. The difference of weight before and after ignition gives the total amount of sulphocyanide of

sinapine and myronate of potash. Subtracting the amount of the latter, the difference is the amount of sulphocyanide of sinapine.

After the extraction with alcohol, the filter contains only the myrosine and cellulose, together with a little coloring matter. The alcohol is allowed to evaporate spontaneously, and then the myrosine and cellulose are treated in the cold with a ½ per cent. soda solution. The solution containing the myrosine is decanted through a weighed filter, and the residue is treated again in the same manner. By this treatment all the myrosine is obtained in solution. The cellulose on the filter is dried, weighed, ignited, and the ash weighed. The difference between the two weights gives the cellulose.

The solution containing the myrosine is just neutralized with dilute hydrochloric acid, and about 50 cc. of Ritthausen's cupric sulphate solution added. The solution is then *exactly* neutralized with dilute soda, and the heavy green precipitate of the compound of copper and myrosine allowed to settle to the bottom of the beaker.

The precipitate is collected on a weighed filter and dried at 110°. After drying, the weight of the precipitate is taken. It is then ignited and the ash weighed, the difference giving the total amount of myrosine.

The two following analyses of a sample of brown mustard farina, prepared by H. K. and F. B. Thurber & Co., New York, were made simultaneously. Afterwards a third analysis was made on the same sample.

Analysis of Brown Mustard Farina.

	1	2	3
Moisture, ...	6·78	6·90	6·82
Myronate of potash, .	0·61	0·61	0.72
Sulphocyanide of sinapine, .	10·97	11·19	11·21
Myrosine, . . .	28·45	28·70	28·30
Mustard oil, . . .	29·22	29·21	29·19
Cellulose by difference, .	20·24	19·55	20·06
Ash, ...	3·73	3·84	3·70
	100·00	100·00	100·00

A combustion was made of the same mustard, and the nitrogen determined. The sulphur was likewise determined by fusing with alkaline carbonates and nitrates and precipitating with barium chloride.

Nitrogen = 5·337 per cent. Sulphur = 1·489 per cent. Calculating the amounts of nitrogen and sulphur in the myronate of pot-

ash, the sulphocyanide of sinapine and the myrosine, we find nitrogen, 5·342 per cent., and sulphur, 1·50 per cent.

If the amounts of the three last-named constituents of the mustard be deduced from the total amounts of nitrogen and sulphur, according to Hassall, the following will be the percentages:

Myronate of potash, . . .	0·61	per cent.
Sulphocyanide of sinapine, . .	10·71	"
Myrosine, ...	28·52	"

In this case, the results obtained by calculation from the percentages of nitrogen and sulphur are almost identical with those obtained by direct determinations. But the greater ease and certainty of the direct method, and the very considerable errors which are possible when calculations are instituted upon results differing but very slightly from the true ones, must strongly recommend, it appears to us, the direct as compared with the indirect method.

If the mustard is adulterated with starch or flour, the foregoing scheme of analysis may be used as well in the case of pure mustard. After the extraction of the oil with ether, and the sulphocyanide of sinapine and myronate of potash with alcohol, the residue may be treated either with malt extract or with acids under pressure to convert the starch into glucose. The glucose may be estimated as usual.

Fearing that starch was not entirely insoluble in dilute alcohol, and not being able to learn anything on the subject from books, an experiment was made of boiling starch for some time in a mixture of half alcohol and half water. The boiling liquid was filtered hot, and to the filtrate a few drops of iodine solution added. No blue coloration taking place, the starch may be considered insoluble in dilute alcohol, and hence could not interfere in the determination of the sulphocyanide of sinapine and myronate of potash.—*Jour. Am. Chem. Soc.*, 1881, p. 130.

PRACTICAL NOTES FROM VARIOUS SOURCES.

By the Editor.

For the rapid preparation of Oxygen Voracek recommends adding hydrogen peroxide to potassium permanganate when the evolution takes place at the common temperature and without requiring special caution. According to "Industrie-Blätter," No. 15, a much cheaper source is barium peroxide, to 15 grams of which are added 100 cc. of a mixture of equal volumes of concentrated potassium bichromate

solution and nitric acid, sp. gr. 1·2. Instead of the bichromate, potassium permanganate may be employed, but is more costly.—*Arch. d. Phar.*, May, 1882, p. 369.

Karlsbad Sprudel Salt, which was formerly very improperly prepared (see this journal, 1878, p. 474, and 1880, p. 133, 257), is now obtained by heating the spring water to boiling, filtering, evaporating and saturating the residue with carbonic acid from the springs. The composition of the salt is as follows: Sodium bicarbonate 35·95, lithium bicarbonate ·39, sodium sulphate 42·03, potassium sulphate 3·25, sodium chloride 18·16, sodium fluoride ·09, sodium borate ·07, silicic anhydride ·03, and ferric oxide ·01 part. One liter of sprudel water yields about 5½ grams of salt.

An *artificial* salt resembling the preceding is made, according to Prof. Harnack, by mixing exsiccated sodium sulphate 100 parts, sodium bicarbonate 80 parts, and sodium chloride 40 parts. *Phar. Centralh.*, 1882, No. 21, p. 241.

Oxidation of Cane Sugar by Chromic Acid.—Dr. Carl Heyer has studied the effect of chromic acid upon cane sugar and ascertained the products of oxidation to be formic acid, oxalic acid, and carbonic $2CO_2+2CH_2O+2C_2H_2O_4$. The same amount of sugar yielded with anhydride. The formation of oxalic acid had been overlooked by previous investigators, probably because chromic oxalate forms soluble double salts with calcium chloride as well as with ammonia. The result of the action of 8 equiv. CrO_3 upon 1 equiv. $C_{12}H_{22}O_{11}$ was: 12 equiv. CrO_3: $4CO_2+4CH_2O_2+2C_2H_2O_4$; while with 16- equiv. CrO_3 only carbonic anhydride was formed $=12CO_2+11H_2O$.—*Arch. d. Phar.*, May, 1882, p. 336–350.

Oxidation of Cane Sugar by Potassium Permanganate.—Maumené reported (1872) having obtained two new acids, hexepinic and trigenic acids among the products of the reaction between the two compounds. Dr. C. Heyer, however, found the supposed hexepinic acid to be merely oxalic acid, and the trigenic acid to be a syrupy liquid containing free acetic and formic acid and potassium salt. The results of oxidation are the same as with chromic acid, carbonic anhydride, oxalic acid, and formic acid. Oxalic acid is produced only in very dilute solutions and at the ordinary temperature; in the presence of free sulphuric acid only carbonic anhydride and formic acid are produced, and with a sufficient amount of permanganate the sugar is completely oxidized to carbonic anhydride and water.—*Ibid.*, June, p. 430–450.

A Peculiar Reaction of Quinine Hydrochlorate.—Dr. Vulpius observed that under certain circumstances a solution of this salt is not precipitated by nitrate of silver. If, for instance, 50 grams of a one per cent. solution of this salt be kept in a rotating motion, over 10 grams of silver nitrate solution of the same strength may be added drop by drop before a precipitation of silver chloride is produced. If, however, a single drop of the silver solution be permitted to flow into the test tube without agitation a dense precipitate is at once produced which by subsequent agitation may be finely divided, but does not yield a clear solution. It is possible that at the moment of contact a soluble double salt may be formed.

A solution of morphine hydrochlorate is at once precipitated by silver nitrate.—*Archiv d. Phar.*, May, 1882, p. 361.

Testing of Benzoic Acid.—C. Schneider has modified Schacht's method (see this journal, February, p. 56) of testing benzoic acid, sublimed from Siam benzoin, by using 16 (instead of 5) drops of $\frac{1}{2}$ per cent. solution of potassium permanganate, which is completely decolorized and after eight hours the liquid remains colorless ("Phar. Zeitung," No. 20). The artificial benzoic acids, or such sublimed with Siam benzoin, or prepared from benzoin by the wet process, do not effect the complete reduction of the test solution, and in the presence of cinnamic acid the odor of benzaldehyde becomes apparent. The sublimed acid, carefully preserved in dark-colored bottles, does not lose this deoxidizing power on keeping.

Mr. Jahns having noticed the strong reducing power of vanillin upon permanganate, experiments were also made with this compound and with mixtures of vanillin and toluol-benzoic acid. Such mixtures, more particularly those containing $\frac{1}{10}$, $\frac{1}{20}$, or $\frac{1}{30}$ of vanillin behave very similar to sublimed benzoic acid; but, aside from the peculiar odor, the liquid, after eight hours, is of a distinct yellow color, and contains a deposit of colorless or slightly colored crystals.

The author regards the permanganate test as well adapted for distinguishing benzoic acid, sublimed from benzoin, from the acid of other sources, and from that which is contaminated with cinnamic acid. But he advocates its preparation by the pharmacist.—*Archiv d. Phar.*, June, 1882, pp. 401–403.

Professor Ed. Schaer has likewise made a series of comparative experiments with benzoic acid of different origin and permanganate,

following Schacht's directions, and arrived at the following conclusions:

1. Benzoic acid, sublimed from benzoin, exerts a striking reducing action, both in acid and alkaline solution, upon permanganate solution, not shared by benzoic acid of other modes of preparation, or only in a limited degree. The non-officinal benzoic acids give, in alkaline solution, at first a green color.

2. Benzoic acid, prepared from benzoin with lime, behaves like the artificial acid, and resembles the sublimed acid in its reducing action only if prepared from the residues of sublimation or from benzoin containing cinnamic acid.

3. The acid prepared from benzoin with lime does not, by subsequent sublimation, acquire the reducing action of genuine flowers of benzoin.

4. Non-officinal benzoic acids acquire, by sublimation with benzoin, the reducing action upon permanganate; but even with an addition of 20 per cent. of benzoin before the sublimation, the action is by far less pronounced than that of the officinal acid.

5. Cinnamic acid possesses an energetic reducing action in acid and alkaline solution, and in mixtures with non-officinal benzoic acids modifies the behavior of the latter.

6. Benzoic acid, which does not reduce permanganate in acid solution, and causes with it a green color in alkaline solution, does not acquire the property of instantaneously reducing the permanganate, even when mixed with 10 per cent. of cinnamic acid; the reduction takes place only after several minutes.—*Archiv d. Phar.*, June, 1882, pp. 425–430.

THE CONVERSION OF MORPHIA INTO CODEIA.

By D. B. Dott, F.R.S.E.

The first chemist to announce the conversion of morphia into codeia was E. Grimaux, whose experiments are described in "Comptes Rendus" (see "Am. Jour. Phar.," 1881, p. 466). Reference must also be made to the communication of O. Hesse to the "Pharmaceutical Journal" ([3], xii, 157), on the "Methyl Ether of Morphia." The former of these chemists, by acting on morphia dissolved in alcoholic solution of soda with iodide of methyl, in molecular proportions, obtained a crystalline alkaloid which resembled codeia in all its properties, with the apparent exception of possessing a slightly different

rotatory power. M. Grimaux considers that this divergence must not be taken as proving any difference in the alkaloids, but, judging from their exact agreement in other respects, is probably only an error of experiment. Hesse attempted to prepare codeia by acting with methyl iodide on a methylic alcohol solution of morphia potassium. By this means he obtained β-methyl-morphia, isomeric with codeia. According to Hesse's description, this alkaloid is amorphous, and its hydrochloride differs in some important respects from that of codeine. For instance, it loses all its water of crystallization at 100°C., while hydrochloride of codeia loses only half a molecule under the same circumstances. The solubility of the artificial salt at 18°C., in water, is 1 in 10·8, while that of codeia muriate is 1 in 23·8. A saturated solution of the former gives, with potash, an oily, permanently amorphous precipitate, but the codeine salt gives at once a crystalline precipitate. The specific rotatory power of both was found to be the same. Hesse holds that the idea of the identity of these two salts cannot be maintained on account of the differences above referred to, especially the fact of the β-methyl-morphia being only obtained in the amorphous state. As, however, M. Grimaux did not employ morphia-potassium, but morphia-sodium, Hesse repeated his experiment, using the latter instead of the potassium compound, but in other respects conducting the experiment as before. By this means he obtained a mixture of β-methyl-morphia and a base having a "great similarity to codeia," differing indeed therefrom only in its optical behavior.

In my first experiment I conducted the operation of converting the morphia into codeia, according to the process described by Grimaux, using molecular proportions of morphia, soda, and methyl iodide. The alcohol was distilled off and the residue exhausted with ether. The ether, on evaporation, deposited well-defined crystals, resembling the ordinary hydrate of codeia. These crystals were converted into hydrochloride, which was purified by recrystallization from water. An aqueous solution was prepared by digestion at the ordinary temperature, and the solubility of the salt determined by evaporating a weighed portion of the solution to dryness, the weight of the residue *plus* 2·42 per cent. being taken as the weight of crystallized salt dissolved. At 12°C. the solubility indicated was 1 in 27·0. As regards its rotatory power, the result obtained was $(\alpha)_{0} = -109·9$. Codeia hydrochloride prepared from opium gave a solubility of 1 in 28 2 at 12°C., and a specific rotatory power (determined as above) of — 111·6.

I next prepared β-methyl-morphia in the manner described by Hesse, using equal molecules of the substances and potassic in place of sodic hydroxide, as employed by Grimaux. After digestion of the alcoholic solution on the water-bath for an hour, hydrochloric acid was added to neutralization, and the spirit evaporated. The residue was treated with potash in excess and exhausted with ether. When left to spontaneous evaporation, the ether yielded large crystals having all the appearance of codeia. These crystals were converted into muriate, which was crystallized two or three times. The salt thus obtained resembled the ordinary codeia hydrochloride. By allowing a hot aqueous solution to cool, the solubility obtained for 15°C. was 1 in 23·4. I refrain from entering much into detail, as I intend to have the subject thoroughly investigated, especially as regards the optical properties of the substances.

Reviewing the results obtained by Grimaux, Hesse, and myself, I regard it as almost certain that codeia "α-methyl-morphia" and "β-methyl-morphia" are one and the same. It is difficult to account for the behavior of Hesse's β-methyl-morphia hydrochloride, as it is quite at variance with my experiments, both as regards solubility and loss of water at 100°C. I have a strong impression that the salt he worked with was impure. Be that as it may, it is certain that the only difference which has been observed between codeia and α-methyl-morphia is the slight variation in their rotatory power. I agree with M. Grimaux in not attributing great importance to this. It is probably due to the persistent presence of some impurity, which is dextro-rotatory or optically indifferent. In common with Hesse, I would discountenance the proposal of Grimaux to name the ethers of morphia "codeines." There does not appear to be any advantage in such a name, which could only lead to confusion. When the constitution of these bases is fully understood a satisfactory systematic nomenclature may then be introduced.—*Phar. Jour. and Trans.*, June 10, 1882.

THE METHYL ETHERS OF MORPHINE.

By O. Hesse.

In a former communication I drew a distinction between α-methyl-morphine, which body I obtained through the action of methyl iodide upon morphine-sodium, and β-methyl-morphine, which alone could be obtained by the action of methyl iodide upon morphine-potassium. In

consequence of the recent remarks of Dott upon the same subject, I wish as a supplement to that communication to mention some facts that I have observed since my former publication on the ether in question.

With respect first to the α-ether, it is known that it differs from codeine only slightly in its optical behavior. It turns out, however, that this difference is not an essential one, since the hydrochlorate, after several recrystallizations from water, agrees perfectly with codeine hydrochlorate in its optical character also. There is, therefore, no doubt that the synthetically prepared codeine is identical with that occurring in opium.

Experiments which were made by me to clear up the question showed further that codeine, or the α-methyl-ether of morphine, is also formed when morphine-potassium is used (instead of morphine sodium), but that the yield of codeine sometimes amounts to not more than traces. This unfavorable result is for the most part due to the fact that methyl iodide which has not yet taken part in the reaction, combines with the codeine formed to produce iodomethyl-codeine. In this process there is also a formation of iodomethyl-morphine, and when calculated quantities of morphine, methyl iodide, and potassium hydrate (or sodium hydrate) are used, it is clear that at the conclusion of the reaction free alkali must be present in the solution.

This alkali leaves the codeine that may have been formed, as well as the iodomethyl-morphine, unaltered upon warming, but the iodomethyl codeine very readily decomposes it in accordance with the equation:

$$C_{17}H_{18}(CH_3)NO_3,CH_3I+KOH=C_{17}H_{17}(CH_3)_2NO_3+KI+H_2O.$$

Consequently dimethylmorphine is formed, and it was this body that I obtained before and described under the name of "β-methyl-morphine." The formation of this body takes place more readily when, as was done by me previously, alkali is added before extraction with ether.

The β-methyl-ether is naturally most conveniently prepared by the direct action of potash or soda ley, ammonia or baryta water upon iodomethyl-codeine. Its formation takes place gradually even at the ordinary temperature, but rapidly upon heat being applied.

I had on a former occasion found the amount of chlorine in the hydrochlorate somewhat too high, which would on the other hand account for a deficiency in the amount of carbon. The ground of this former discrepancy I cannot state, since I cannot detect any contami-

nation with another substance in the salt in question. However, in my recent operations I have obtained results corresponding strictly with the formula $C_{17}H_{17}(CH_3)_2NO_3,HCl+2H_2O$.

The hydrochlorate of the β-methyl-morphine (dimethylmorphine) dissolves in pure concentrated sulphuric acid with a coffee-brown color, which, however, soon passes into dark violet. In this it distinctly differs from the hydrochlorate of the codeine prepared from opium, which gives a colorless solution with concentrated sulphuric acid.

On the other hand, I may remark with respect to the hydrochlorate of the synthetically prepared codeine that it not unfrequently dissolves in concentrated sulphuric acid with a faint brownish or violet color. This reaction is nevertheless not characteristic of this substance, but is due to an admixture of dimethylated morphine.

The two methyl ethers are consequently two well characterized substances, the relations of which to morphine will be clearly seen from the following:

Morphine,	$C_{17}H_{17}NO\left\{\begin{matrix}OH\\OH\end{matrix}\right.$
Monomethyl Morphine, α-Methyl-Morphine, Codeine,	$\left.\right\}C_{17}H_{17}NO\left\{\begin{matrix}OH\\OCH_3\end{matrix}\right.$
Dimethyl-morphine, β-Methyl-morphine,	$\left.\right\}C_{17}H_{17}NO\left\{\begin{matrix}OCH_3\\OCH_3\end{matrix}\right.$

—*Phar. Jour. and Trans.*, June 17, 1882.

QUININE IODATE AND BROMATE, AND THE PHYSIOLOGICAL ACTIVITY OF SUPEROXIDIZED MOLECULES.

By Charles A. Cameron, M.D.

Read before the Medical Society of the King and Queen's College of Physicians, Wednesday, May 3, 1882.

The researches of Arthur Gamgee, Priestley and Larmuth have shown that the three forms of phosphoric acid and of vanadic acid have very different degrees of physiological activity. The salts of orthophosphoric acid are almost inert when their bases are inactive, whilst the pyrophosphates and metaphosphates are poisonous. The orthovanadic acid is poisonous, but pyrovanadic acid and metavanadic acid are still more poisonous.

The high physiological activity of the pyro- and metaphosphates has been attributed to the unsaturated condition of their nuclei. These salts are not statical, for they can take up additional basic material. For example, calcium metaphosphate can combine with two molecules

of lime to produce a molecule of calcium orthophosphate—$Ca(PO_3)_2 + 2CaO = Ca_3(PO_4)_2$.

Carbon dioxide and carbon monoxide are poisonous, but the latter is by far the more poisonous. According to the modern doctrine of atomicity, carbon atoms have four "bonds," that is, a carbon atom has an atom-fixing power equal to that of four atoms of hydrogen or other monad elements. In carbon dioxide the four bonds of the carbon atom are fully satisfied by the four bonds of the two oxygen atoms, $O=C=O$.

In carbon monoxide only two of the carbon atom bonds are in combination with oxygen, and the remaining bonds combine with each other, $C=O$. Such a molecule is said to be unsaturated.

High Molecular Weights a Cause of Physiological Activity.—High atomic weight and complex molecular structure are stated to be causes of high physiological activity. The poisonous elements have as a rule higher atomic weights than elements belonging to the same groups which are comparatively physiologically inert. There are, however, exceptions to these rules. Lithium, with an atomic weight of 7, is more active than sodium, with an atomic weight of 23. Arsenic, with a lower atomic weight than antimony, is more poisonous than the latter. Chlorine in the free state is more active than iodine, though on the whole the iodine compounds used in medicine have somewhat smaller doses than the corresponding chlorine compounds.

Rabuteau found that with one exception (that of methyl alcohol) the toxic power of the alcohols increased with their molecular weight. Amyl alsohol, which has a molecule composed of 18 atoms, is eight times more poisonous than ethyl alcohol, the molecule of which contains 9 atoms. On the other hand, oxalic acid has a molecular weight of 90, and is poisonous, whilst malic acid, with a molecular weight of 134, is a constituent of wholesome fruits. Albumin has a very high molecular weight.

Superoxidized Bodies.—Physiological activity seems to be more influenced by an unsaturated condition of molecules than by their molecular weight or degree of complexity. It is also, I am disposed to believe, influenced by a condition of molecules which I venture to describe as *superoxidized.* In potassium iodide we have, according to the doctrine of quantivalency, a saturated molecule. The salt is composed of two monad elements, and the unit of equivalence of each of its two atoms is fully satisfied. According to the graphic or pictorial

method of representation the molecule is constituted as follows, K—I.

Although potassium iodide is a saturated and a stable body, three or four atoms of oxygen may be combined with it so as to form potassium iodate (KIO_3) or potassium periodate (KIO_4). In the latter salt only two of the atoms of oxygen are in union with the potassium and iodine, six oxygen bonds satisfying each other, K—O—O—O—O—I. In this compound there are three atoms of oxygen in excess of the number requisite to saturate the iodine and potassium; hence we may term potassium periodate a superoxidized compound.

Periodic anhydride is a more striking example of a superoxidized body. It is composed of two atoms of iodine combined with seven of oxygen, I—O—O—O—O—O—O—O—I. In this compound only two of the fourteen oxygen bonds are in combination with the iodine.

It may of course be said that iodine is a septivalent element, but in atom-fixing power it acts in general like other monads.

If we hold that iodine and bromine are monads, then the higher terms of their oxygen series may be regarded as in reality unsaturated molecules. They contain oxygen atoms combined only with other oxygen atoms. Such compounds are unstable. They are all decomposed by simple heat at comparatively low temperatures.

When superoxygenated compounds are introduced into the system, it might be expected that their oxygen being loosely combined would unite readily with elements of the blood. It is, however, stated that potassium chlorate passes through the body unchanged. It is open to doubt whether or not the whole of the chlorate taken appears subsequently in the urine. It has been alleged that quinine passes unchanged through the body, but it is now known that only two-thirds of the quinine taken into the stomach can be detected subsequently in the urine. Even if all the potassium chlorate taken were found afterwards in the urine, that would not be positive proof that the potassium chlorate had not been partially deoxidized and reoxidized in its passage through the system. Besides drugs produce powerful catalytic effects without undergoing themselves any chemical changes.

Potassium iodate appears to act more powerfully upon the system than potassium iodide. I know a person, accustomed to take ten grain doses of potassium iodide without experiencing any unpleasant symptoms, who cannot take even five grains of the iodate without being attacked by coryza.

I am disposed to believe that the chlorates, bromates, and iodates are more active physiological agents than the corresponding chlorides, bromides, and iodides; they are all composed of superoxidized molecules. It is certain that chlorate of sodium is more powerful than chloride of sodium, or common salt. We may from analogy infer that iodate of potassium is a more active physiological agent than the iodide of potassium.

Ferric Iodate.—Some years ago I suggested the use of ferric iodate ($Fe_2(IO_3)_6$) as a substitute for the unstable ferrous iodide ("Dublin Quarterly Journal of Medical Science," May, 1869, vol. xlvii, p. 354) It was largely prescribed in Dublin, and although a nearly insoluble salt, it was found in large doses to produce iodism. It was favorably noticed by Dr. Anstie in "The Practitioner" for June, 1869, p. 366.

Quinine Iodate.—Last year I gave a formula for the preparation of iodate of quinine in combination with an effervescing preparation, to Messrs. J. J. Graham & Co., of Westmoreland street, Dublin, and since last May, they have, as they inform me, disposed of nearly 1 cwt. of the compound. It has been prescribed largely by Mr Porter, surgeon to her Majesty, Dr. Samuel Gordon, Professor Moore, Dr. Smyly, Professor Macnamara, and many other leading practitioners. These gentlemen inform me that they have found it a very useful remedy in the treatment of neuralgia, severe articular pains which had resisted the employment of the usual remedies, sluggish forms of pulmonary congestion, secondary syphilitic disease, and malarial enlargement of the spleen.

Iodate of quinine is a salt which appears to have been scarcely studied; only two references to its existence are to be found in the books and journals relating to chemistry and pharmacy. Sérullas states ("Annales de Chimie et de Physique, t. xlv, 282,) that it may be prepared by dissolving quinine in a hot solution of iodic acid, and that on cooling the solution the salt crystallizes out in a form resembling sulphate of quinine. Sérullas does not appear to have analyzed the salt. According to Pelletier and Caventou ("Annales de Chimie et de Physique"), both iodate and hydriodate of quinine are formed by digesting quinine and iodine by the aid of heat.

Quinine iodate may be prepared by digesting freshly precipitated and still moist quinine with a warm solution of iodic acid, in the proportion of a molecule of each (the iodic acid should be dissolved in 8 or 10 parts of water). The resulting mass cannot be dried at the water-

bath heat as it causes some decomposition of the salt. Dried at a temperature of 60°F., and then placed *in vacuo* over sulphuric acid, it undergoes no further loss of weight. The salt has a white, pearly appearance, and consists of extremely minute needle-shaped crystals, which contain no water; boiling water does not decompose it; it is very slightly affected by strong sulphuric acid; hydrochloric acid and dilute sulphuric acid dissolve it readily; it is not quite so soluble in acetic acid. Spirit of wine effects its solution readily, but in ether and chloroform it is sparingly soluble. Seven hundred parts of cold water dissolve one part of the iodate; in warm water it dissolves much more readily.

The mean of several determinations of the amount of iodine in the dried iodate of quinine gave 21·8 per cent.; the salt has therefore the following formula: $C_{20}H_{24}O_2N_2,HIO_3$. The theoretical amount of iodine for such a formula is 22·92, but the small deficiency in the salt was due to the presence of a little free quinine; the iodate was found to be faintly alkaline from this cause.

The granulated effervescing iodate of quinine is composed of a mixture of the pharmacopœia compound of sodium bicarbonate and citric and tartaric acids with the iodate. Each drachm of the compound contains 2 grains, or one dose of the iodate.

I have not made many examinations of the urine of persons under administration of quinine iodate. In the case of a patient of Dr. Elliott who was using the iodate for about a fortnight, the urine contained so much free hydriodic acid or iodides, that it gave a yellow precipitate with nitrate of lead. In another case, iodic acid and hydriodic acid were detected in the urine within half an hour after the iodate had been taken, but no trace of quinine could be found in it. In the urine of the same person, passed three hours later, quinine was found.

Bromate of Quinine ($C_{20}H_{24}N_2O_2,HBrO_3$).—I can find no account of this salt in the chemical books or journals; so far as I am aware, it has not been described up to the present. It may be prepared by precipitating barium bromate by sulphate of quinine, or by neutralizing quinine with bromic acid. It occurs when air-dried in small asbestos-like masses, which, under the microscope, are seen to consist of very long needles.

Quinine bromate has the same constitution as the iodate of quinine, but it is more soluble in water, namely, 1 part in 250. Warm water dissolves it freely. The dry salt may be heated on the water-bath

without discoloration, but its solution, when evaporated to dryness, leaves a residue more or less decomposed. The salt dissolves readily in hydrochloric and dilute sulphuric acids, and in spirit of wine. Acetic acid acts less readily upon it; touched with a drop of strong sulphuric acid it detonates, emits a puff of dark smoke, and almost wholly disappears. On iodate of quinine, sulphuric acid produces only a slight yellow coloration, which vanishes on the addition of water, the salt dissolving and forming a colorless solution.

The original paper is supplemented by the medical opinions of a number of physicians who state that they have found the quinine iodate and bromate valuable remedial agents.—*Phar. Jour. and Trans.*, July 1, 1882; from *Dublin Jour. of Med. Sci.*, June 1882.

THE PRODUCTION OF OXYCHLORIDE OF CARBON IN CHLOROFORM.

By J. Regnauld.

The compound incontestably the most dangerous by which chlororoform can be contaminated is the oxychloride of carbon (chloroxycarbonic gas, phosgene, etc.) resulting from its decomposition when exposed to air and radiant light.

Previous to studying the physiological, or rather toxic properties of oxychloride of carbon, Messrs. Regnauld and Roux thought it would be interesting to determine the exact conditions of its formation in chloroform, on which point there exists a difference of opinion, since the alteration of chloroform can only be prevented when its true cause has been ascertained. They now publish the results of some preliminary experiments in which the slow action of light has been substituted by the more rapid influence of electricity and ozone.

(1) The spark from a Ruhmkorff coil discharged in a mixture of chloroform vapor and atmospheric air immediately gives rise to a large proportion of oxychloride of carbon.

(2) When air saturated with chloroform vapor is caused to circulate slowly in an effluve apparatus the chloroform is decomposed and yields a gaseous product consisting nearly entirely of phosgene, recognizable by its intolerably suffocating odor, and its conversion in contact with barium hydrate into barium chloride and carbonate.

(3) A bulb of thin glass, full of chloroform, and sealed at the lamp, was placed in a recipient which was first exhausted and then filled

with air ozonized by the electric discharge. The bulb being broken, the vapor of the chloroform, in contact with the ozonized air, was changed into oxychloride of carbon.

(4) In presence of atmospheric oxygen, therefore, chloroform is decomposed by the passage of the spark or the current. Further, the production of phosgene is independent of the thermic and electric phenomena of the first two experiments, since it takes place upon simple contact of the vapor of chloroform with ozonized air.

(5) If a current of nitrogen entirely free from oxygen and mixed with vapor of chloroform be passed through an effluve apparatus, the chloroform is decomposed; but in the absence of oxygen no oxychloride of carbon is formed. The formation of hydrochloric acid is evident, as well as of aromatic products remarkable for their intense and persistent odor which recall in a high degree those of several essential oils. The authors have since identified these odorous compounds with the trichloride of carbon (C_3Cl_6) or the sesquichloride (C_4Cl_6).—*Phar. Jour. and Trans.*, June 17, 1882; *Journal de Pharmacie et de Chimie* [5], v. 504.

SOME REMARKS UPON MODERN PHARMACEUTICAL STUDY.

By H. J. Möller.

(Continued from page 323.)

Switzerland.

While, in the middle ages and the few following centuries, the science of pharmacy in Switzerland was developed nearly up to the German requirements, in later years, French influence, starting from Geneva, has modified Swiss pharmacy, and has extended itself more and more towards the northeast. For example, when in the summer of 1880, I crossed Switzerland on my journey from Vienna to Strassburg, I had full opportunity to observe that the pharmacies in Geneva were fitted up quite like those in Paris, while the pharmacies in Basel and Berne had quite the same aspect as in South Germany.

The new rules for pharmaceutical study in Switzerland tend to combine these two different systems.

The Swiss pharmacy cannot only boast of possessing the greatest pharmacologist[1] of the present day amongst its sons, but Switzerland still possesses pharmaceutists with such enthusiasm for their science as Professor E. Schär in Zürich, and it is, therefore, quite natural that the Swiss pharmacy is still developing itself, and that the new plan for pharmaceutical study will raise this country to a high position in our science.

[1] Professor F. A. Flückiger was from 1853 to 1860, a pharmaceutical chemist in Burgdorff, at Berne, and later a professor at the university at the last mentioned city. He first went to Strassburg in the year 1873.

I am highly indebted to Professor E. Schär, who has kindly given me all the information for which I asked, and has also sent me a copy of the new plan, for the study of which plan I here shall translate that part which I think will be the most interesting to the readers of this Journal.

The title of the law is the following: "Verordnung für die eidgenössischen Medicinalprüfungen (Vom 2 Heumonat), 1880." [1]

Art. 1. The pharmaceutical examinations are held in Basel, Berne, Geneva, Lausanne and Zürich.

Art. 52. The pharmacists must pass two examinations (corresponding to the English "Minor" and "Major.")

Art. 53. *The "Minor"* ("die pharmaceutische Gehülfenprüfung") can only be passed by the candidate who in advance has deposited: (1) the certificate of a "Preliminary examination" (exactly corresponding to the above-mentioned German "Preliminary examination"); (2) the certificate of an apprenticeship of three years (two years are sufficient if he has passed *all* the classes in the "Gymnasium" (again the same as in Germany and Russia).

Art. 54. *The practical part* of the "Minor" embraces: (1) a written and an oral translation of two articles from the Pharmacopœa Helvetica; (2) the preparation of at least three remedies according to prescriptions; (3) the making of a chemical and a "galenical" preparation after the Pharmacopœa Helvetica; (4) two not very difficult analyses of officinal drugs or preparations.

Art. 55. *The oral examination* for the "Minor" consists of: (1) Systematic botany and special knowledge of the medical and economical plants; (2) elementary physics; (3) pharmaceutical chemistry; (4) materia medica; (5) dispensing of medicines, posology, and the rules for pharmaceutical preparations.

Art. 57. *The "Major"* ("die pharmaceutische Fachprüfung.") Before the student can be admitted to this examination he must have passed the "Minor," have been an assistant for a year, and have studied at the universities for *at least* four semesters (*i. e.*, two years). In these two years he is occupied with his studies only, and must, in this time, also work in the chemical laboratory of the university.

Art. 58. The "Major" is divided into a practical (including a written), and an oral examination.

The practical consists of: (1) Two chemico-pharmaceutical preparations and a written report upon these; (2) a qualitative analysis of an adulterated substance (medicine or food), or of one impregnated with poison, and a written report upon it; (3) a qualitative analysis of a mixture which ordinarily does not contain more than six substances (with written report), (4) a quantitative analysis of one substance in a mixture (volumetric and gravimetric analysis, with written report); (5) a microscopical research of some substances; (6) a written elaboration of a subject, taken from pharmacy, materia medica, or applied chemistry.

Art. 59. *The oral part* of the "Major" embraces: (1) Botany; (2) physics; (3) mineralogy; (4) theoretical chemistry; (5) pharmaceutical chem-

[1] *I. e.*, July.

istry; analytical chemistry (including forensic analysis, hygiene and sanitary police); (7) materia medica; (8) pharmacy.

Art. 73. This law will be in force January 1, 1881.

This plan for pharmaceutical study must be regarded as one of the best at the present day, and is indeed an honor to Swiss pharmacy.

Formerly, the number of pharmacies was a limited one, but according to the *Bundesgesetz*, vom 19. Christmonat,[1] 1877, every pharmacist who has passed his "Major" is now allowed to establish himself when and where he will.

SPAIN.

I shall here translate that part only of the Danish edition of my remarks on this country which especially concerns the modern Spanish pharmaceutical study. All my information obtained upon this country I have obtained from Don Pablo Prolongo, the most important pharmacist in Málaga, through the kind offices of Mr. H. W. Scholtz, the Danish Consul in that city.

Spanish pharmacy, which in a part of the middle ages—through the influence of Arabian culture—held the highest position in the world, had, about the end of the last century, fallen greatly into decay. Then Don Carlos declared (in the year 1800) pharmacy independent of medicine, and new rules were formed for the "visitation" of the pharmacies and for the pharmaceutical examinations. In 1804 a special pharmaceutical committee was elected to complete these reforms, and the result of the activity of this "junta superior" was the establishment of four pharmaceutical academies,[2] first in Madrid (1815), later in Sevilla, Barcelona (now in Granada), and Santiago de Compostela.

In order to be admitted to these four academies it was only demanded that the young man should be a "bachiller en filosofía escolástica" (corresponding to the German "student" and the French "bachelier"). The first year he learned botany, zoology and mineralogy, which lectures lasted for nine months. In the second year he learned physics (three months) and chemistry (six months). In the third year, materia medica; and in the fourth year, experimental pharmacy (theory and practice). When he could prove that he had followed all these lectures, he might pass the examination to be a "bachiller en farmacia." *Afterwards* he must spend two years in practical work in a laboratory, managed by a pharmaceutical teacher,[3] and if he could at length prove that he had passed all his six years of study, he might present himself for examination as pharmacist and then be a "licenciado en farmacia." If he made further studies he could become a doctor in pharmacy.

Some months ago the Spanish Government published a new law, which arranges pharmaceutical study in a very interesting way. This law has the title "Real decreto de trece de Agosto de mil ochocientos ochonto" (Royal decree of the thirteenth of August, 1880) and embraces all the studies

[1] *I. e.*, December.

[2] A. Phillippe und H. Ludwig: "Geschichte der Apotheker," Jena, 1858, p. 1073.

[3] The letter of Don Pablo Prolongo reads thus: "*Posteriormente* debia paror dos años de práctica en una oficina de un profesor de la misma facultad" (*i. e.*, the Faculty of Pharmacy).

in the universities;[1] here I shall communicate that part of the law only which especially regards pharmacy.

The Royal Decree of the thirteenth of August, 1880.

Secondary instruction ("Segunda enseñanza").

Article 11.—The normal distribution of the studies is the following:

First class, Latin and Spanish (first course), geography. *Second class*, Latin and Spanish (second course), history of Spain. *Third class*, rhetoric and poetry, arithmetic and algebra, universal history. French (first course). *Fourth class*, psychology, logic and moral philosophy, geometry and trigonometry. French (second course). *Fifth class*, physics and chemistry, natural history and the elements of physiology and hygiene, elementary agriculture ("Agricultura elemental").

Article 36.—Relates to the Faculty of Mathematics and natural sciences.

Article 48.—Concerns the Faculty of Medicine.

Article 49.—The Faculty of Pharmacy ("Facultad de farmacia").

The studies with this faculty can be made at the universities in Madrid, Barcelona, Granada and Santiago.

Articles 50 and 54.—The lectures of this faculty are arranged in the following way:

A. *The period of licentiate* ("Período de la licenciatura"). *First class*, physics, zoology, botany, mineralogy and theoretical chemistry (these lectures are held by the Faculty of Mathematics and Natural Sciences). *Second class*, animal, botanical and mineralogical materia medica. *Third class*, inorganic pharmaceutical chemistry. *Fourth class*, organic pharmaceutical chemistry. *Fifth class*, practical exercises in the determination of drugs. Practical pharmaceutical operations.

B. *The period of doctorate* ("Período del doctorando"). Chemico-medical analyses. The history of the medico-pharmaceutical sciences.

By this, one will see that the new plan resembles much the old arrangement, except that the two practical years are now confined to one year (*i. e.*, the fifth class). Before the young man commences his five years of study at the university he must be a "bachiller," *i. e.*, have passed all the secondary instruction which is mentioned in Article 11 of the law. Then he follows the lectures at the university during four years as an "alumno de farmacia," and in the fifth year he is practically educated. Now he passes his "Major," and is then a "licenciado de farmacia," and can establish himself as a pharmacist ("farmacéutico," or "boticario") where he will; he must only announce this to the government, and submit to the annual "visitations" of the pharmacies. If he wishes to make some further studies, he can become a doctor in pharmacy. It is very interesting to see how much this arrangement resembles the corresponding examinations in Italy and Greece.

Portugal.

The history of pharmacy in this country resembles very much that of Spain, but the Portuguese pharmacy seems always to have been a little less developed than this science in a neighboring country. My information on pharmaceutical education in Portugal I have obtained from reliable sources,

[1] This decree is published in "La farmacia española," Num. 35 (26 de Agosto), 1880.

through the Danish Consul-General in Lisbon, Mr. F. T. O'Neill. The plan of education is rather old (1854) and differs from the Spanish, but as a reform has lately been made in a neighboring country it is to be believed that an improvement will also soon appear in Portugal. I shall, therefore, give only some short remarks here, more for reason of completeness than because they are very interesting or instructive.

The most important laws, regarding pharmacy, are the decrees of December 29, 1836 (concerning the establishment of pharmaceutical schools); December 21, 1844 (concerning matriculation of pharmaceutical students); August 12, 1854 (concerning the demands at examinations); and April 19, 1866 (concerning the requirements at the examinations of pharmacists of the second class).

To become a pharmacist, it is not always demanded (as in Spain) that the apprentice shall have passed the examination which gives him the right to follow all the lectures at the university. The appentices ("os praticantes," or "os discipulos de pharmacia") must only, before they present themselves for the "Major," have passed a certain number of the classes in the classical school ("os lycêos") and have finished their practical education.

There are two classes of pharmacists.

Of the pharmacists of the second class ("os pharmaceuticos de segunda classe") is demanded a practical education of eight (!) years in one of the pharmacies of the kingdom (. . . . . "oito[1] annos de pratica em qualquer pharmacia do reino" . . . .) in addition to a study of three years in three classical schools. The studies for the last examination are made at the polytechnical schools. It is expressly said that the pharmacists of the second class do not follow the lectures at the medico-pharmaceutical schools, which institutes are to be found in Coimbra, Lisbon and Oporto.

The pharmacists of the first class ("os pharmaceuticos de prima classe") must, on the contrary, have passed the whole classical school. They also pass a course of two years at the polytechnical and medico-pharmaceutical schools. In the polytechnical schools they learn inorganic and organic chemistry, chemical analysis and botany; in the medico-pharmaceutical schools, materia medica and practical and theoretical pharmacy.

After having passed the examination, the pharmacist can establish himself when and where he will. The pharmacists of the sedond class are much more numerous than those of the first class.

(To be continued.)

VARIETIES.

COMP. IODOFORM OINTMENT is made by Dr. Q. C. Smith by mixing iodoform, ergotin, pine tar and balsam Peru, of each ʒi, with vaseline ℥i. —*South. Pract.* April, 1882,

[1] This number is found several times in the Portuguese communications, and can thus be no mistake.—H. J. M.

STYPTIC COLLOID.—The following will instantly coagulate blood, forming a consistent clot, under which wounds will readily heal:

Collodion.	100	parts.
Carbolic acid,	10	"
Tannic acid,	5	"
Benzoic acid,	5	"

Mix the ingredients in the above order.—*Chemist and Druggist.*

USE OF PYROGALLIC ACID.—M. Vidal, after using pyrogallic acid with care in the treatment of psoriasis, has tried a salve with good effect to heal phagedenic ulcers and to cicatrize chancres. He applied it to the ulcer daily for three days, and states that the pain caused is only moderate, and lasts but from eight to ten minutes. The formula he recommends is acid pyrogallic 20 grams and lard or vaseline 100 grams.—*Bull. Soc. de Thérap.*

CAMPHORATED CHLORO-TANNATE OF IODINE is the name given by Dr. Q. C. Smith, of Austin, Texas, to the following preparation which is used as a topical application to bleeding ulcers and cancers of the cervix uteri:

℞	Chloral hydrate,	ʒi
	Iodine,	ʒss
	Oil of camphor,	ʒvi

Dissolve and add sufficient tannic acid to bring the mixture to the consistence of *thick* syrup.—*Southern Practitioner*, April, 1882.

IODOFORM INSANITY.—According to Max Schede ("Centralblatt für Chirurgie," No. 3, 1882), the use of iodoform externally, particularly in children, has been attended by marked psychical symptoms even at times amounting to true insanity. General mental confusion has in at least two instances been traced to it, recovering when local applications of iodoform to wounds have been removed, and reappearing on their reapplication. He has had also one case of deep melancholia result from its use; two cases of raptus melancholicus and the three cases of simple depression. It is probable that iodoform only has these effects in patients of a neuropathic diathesis.—*Chicago Med. Review*, March 15.

CARBOLIC ACID POISONING.—Dr. Inglessi ("Bulletin Générale de Thérapeutique") has arrived at the following conclusions respecting this: First. The symptoms by the external application of carbolic acid are the same as those which arise from the absorption of the poison by the stomach from

the gastric mucous membrane. Second. Poisoning occurs certainly where the acid has been applied to the skin or injected into a serous or mucous or abscess cavity. From the exposed surface of a wound the absorption is very slight, and the toxic effects trifling. The mucous membrane of the respiratory passages may serve as the place of introduction of the poison. Third. The effects may assume a very acute form, a less acute form, or a chronic form. Fourth. There exist certain idiosyncrasies; women and children are especially liable to carbolic acid poisoning. Fifth. The toxic dose is variable. In persons predisposed, one grain of carbolic acid may be sufficient to poison. Sixth. Carbolic acid as an application to contused wounds should be used with caution, and in some cases should even be substituted by a less dangerous agent. Seventh. The treatment of severe carbolic acid poisoning should consist in artificial respiration, diffusible stimulants, especially the hypodermic injection of ether. In other cases the removal of the cause, through the discontinuance of the remedy, will suffice to remove the symptoms.—*Chic. Med. Review*, June 1.

AN ANTI-NAUSEANT.—℞ Creasote, 20 drops; acet. acid, 40 drops; morph. sulph., 2 grains; water, 2 ounces, M. Sig. Teaspoonful in a little water.—*Ohio Med. Jour.*, April, 1882.

THE BENZOATES IN DYSENTERY.—Surgeon Harris ("Ind. Med. Gaz.") states that fifteen grains of benzoate of ammonium or sodium, three or four times a day, are of the utmost value in treatment of acute and sub-acute disentery. This drug, more especially the ammonium salt, causes an active secretion of bile from the liver with cessation of the acute symptoms. In the majority of cases the patients readily tolerate the drug; under its use the stools rapidly become fecal, possibly owing to the excessive secretion of bile, which is thus poured into the intestine, and acts beneficially on the congested and perhaps ulcerated large intestine.—*Practitioner*, Feb.

HOMATROPIN IN THE TREATMENT OF PHTHISIS.—Dr. Froumüller reports ("Memorabilien") sixteen cases of phthisis with night-sweats in which homatropin was successfully used. The usual dose was ·15 (gr.iiss) in pill form, or ·015 (gr.$\frac{1}{4}$) by injection. It was found that one injection would, as a rule, stop the night-sweats for several days. The fever and cough were also lessened, and the drug seemed to have the effect of bringing the disease to a stand-still for a time. The advantage over atropin is that it (homatropin) produces its effects without any toxic symptoms, such as

widening of the pupil, dryness of the throat. etc. The maximum dose is gr.½ to gr.i by injection.—*Med. Record; Amer. Med. Digest*, May.

Agaricus in the Treatment of Night-sweating.—Dr. Wolfenden finds that atropia yields excellent results when given in doses of $\frac{1}{70}$ of a grain. It is, however, a dangerous drug to use, on account of its poisonous properties. Dr. Wolfenden therefore prefers to employ agaricus, which is of equal value to atropia, while it is quite harmless, since ten grains too much or too little produce no toxic effects. Agaricus is a light, bulky, brown powder, of very bitter taste, and is best administered in the form of a confection, with a little jam. Twenty grains are usually quite sufficient given at bedtime, though thirty grains may be necessary to check the sweating completely, the only inconvenience attending the administration of large doses being the great quantity of the powder. Patients, however, make no objection to the bitter taste, etc., when they find how much benefit they receive from its use. Dr. Wolfenden has administered it in nearly forty cases of phthisis with complete success. The only ill effects which have been noticed are, first, sickness, which stops on elimination of the dose; secondly, diarrhœa, which can be averted by combination with one or two grains of Dover's powder.—*Glasgow Med. Journal.*

Dr. Young uses a tincture and a crystalline principle obtained from agaricus. He confirms the above statements, and finds in addition that cough is relieved, sleep induced, and temperature lowered by the drug.—*Med. Times and Gazette; Louisv. Med. News*, May 27.

Amyl Nitrite for Ague.—Dr. Saunders, of Indore, India, reports in the "Indian Medical Gazette" a number of cases of ague successfully treated with amyl nitrite. He asserts that in every instance the disease yielded quickly and permanently to the amyl treatment. He mixes the drug with an equal volume of oil of coriander, to make it less volatile and to cover its odor, and administers it as follows: Four drops of the mixture are poured on a small piece of lint, which is given into the hands of the patient for him to inhale freely; he soon becomes flush, and both his pulse and respiration are much accelerated, and when he feels warm all over, the inhalation is discontinued, as the symptoms continue to increase for some time afterward; a profuse perspiration now sets in, which speedily ends the attack, though in some cases the cold stage merely passes off without any hot or sweating stage.—*Therapeutic Gazette; Cincinnati Lancet and Clinic*, April 8.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The American Pharmaceutical Association will hold its thirtieth annual meeting at Niagara Falls, commencing September 12th. The meeting-room will be in the Cataract House, where will also be the headquarters of the Association. The exhibition will be in the pavilion, located in Prospect Park. The rates secured for the members at the hotels are $3 per day at the Cataract House, International Hotel, and Hotel Kaltenbach, $2.50 at the Goat Island Hotel, Spencer House and Rapids House, and $2 at the Niagara House. The Local Secretary, Mr. H. E. Griffith, has also secured very considerable reductions in the fees of admission to the different points of interest.

From a circular to be issued by the Committee on Entertainment we learn that no concessions in railroad rates can be secured from the main lines, except the regular excursion rates to and from Niagara Falls. Three excursions, commencing at Niagara Falls, passing through Lake Ontario and St. Lawrence River to Montreal and terminating at New York, have been laid out by the committee, and will start after the adjournment of the Association, as follows:

1. Returning *via* lakes Champlain and George, Saratoga and Hudson River; rate, $25.
2. Returning *via* Mount Washington, Profile House, Boston, and Long Island Sound; rate, $41.50.
3. Like No. 2, but including Quebec; rate, $43.50

A very elaborate programme has been laid out for the entertainments at Niagara Falls, comprising instrumental music during the week, an instrumental and vocal concert on Tuesday evening, dancing on Wednesday evening, banquet on Thursday evening, and during the afternoons excursions to various places of interest. The price of tickets admitting to these entertainments will be to gentlemen $5, and to ladies $2.50. Members remitting to the chairman of the committee, Geo. J. Seabury, New York, in advance of the meeting, the price of entertainment tickets, will find apartments ready on arrival and in charge of the Bureau of Information, which the committee has organized, to remain at the Cataract House during the week of the meeting.

Cincinnati College of Pharmacy.—At the meeting held July 13th Messrs. Julius Greyer, F. Serodino, F. A. Kautz and Chas. P. Fennel were elecled members of the Board of Trustees, and Messrs. G. Eger, J. H. Feemster, H. H. Koehnken, F. A. Kautz and J. Greyer delegates to the next meeting of the American Pharmaceutical Association.

The Kentucky State Pharmaceutical Association held its fifth annual meeting in the city of Covington, May 17 and 18. Mr. Zwick delivered the welcoming address. The various officers and committees presented reports, from which it appears that the legislature failed to extend the provisions of the Pharmacy law to the entire State, and also refused to grant the Association a charter of incorporation.

The following officers were elected to serve for the ensuing year: President, G. A. Zwick, of Covington; Vice Presidents—G. Holzhauer, of Newport; Samuel Curry, of Danville; H. Megill, of Owensboro; Recording Secretary, Mr. Elwang, of Louisville; Corresponding Secretary, Mr. McDowal, of Eminence; Treasurer, P. Nodler, of Covington.

The various standing and several special committees were appointed, and after finishing the busiuess before it the Associaton adjourned to meet next year at Eminence.

The Texas Pharmaceutical Association held its fourth annual meeting in Fort Worth, May 9th and 10th, the Second Vice President, Leo Preuss, of Eunis, presiding. The Secretary read the annual address, containing valuable suggestions for the future welfare of the Association. Among the business transacted was the application for a charter and the election of a Committee of Trustees. The following officers were elected to serve for one year: President, E. M Wells, Fort Worth; Vice Presidents—W. J. Morley, of Austin; T. W. Powell, of Fort Worth; and C. F. Hall, of Bryan; Treasurer, E. W. Lancaster, of Marshall; Secretary, W. H. Murdock, of Dallas. The next meeting will be held in Austin, the capital, on the second Tuesday of May, 1883.

The Nebraska Pharmaceutical Association was organized in the Board of Trade rooms in the city of Lincoln, June 21. Dr. Park, of Ashland, was elected temporary chairman and Mr. Whittlesey, of Crete, secretary *pro temp.* The object of the movement was fully explained by Mr. Goodman, of Omaha, and a committee on permanent organization was appointed, which reported at the evening session the constitution and by-laws of the Iowa Association, and these, somewhat amended, were adopted. The officers chosen are: President, E. M. Park, Ashland; Vice Presidents—M. Parr, Omaha; A. D. Wykoff, York; M. Padden, Alexandria; Jas. Reed, Nebraska City; and H. E. Wells, Juniata; Secretary, J. W. Bell, Omaha; Assistant Secretary, W. C. Lane, Lincoln; Treasurer, C. M. Leighton, Lincoln. Various committees were appointed, also delegates to the National Association, and on June 22 the meeting closed and the Association adjourned to meet again at Lincoln on the second Tuesday of June, 1883.

EDITORIAL DEPARTMENT.

County Pharmaceutical Associations.—The Pennsylvania Pharmaceutical Association, recognizing the importance of united action for the development of a higher standard in the practice of pharmacy, has appointed a committee for furthering the organization of new county societies, and this committee has issued a circular which is accompanied, as a guide or aid toward the end in view, by a copy of the constitution and by-laws adopted by the Lancaster County Pharmaceutical Association, recently organized.

A preliminary gathering of the druggists of the county, called by a few druggists who felt an interest in the formation of a county organization, was first made. Afterwards a permanent organization was effected, which now promises to be a source of pleasure and benefit to all engaged.

We sincerely hope that these efforts will meet the deserved success, and that at the next meeting of the Pennsylvania Pharmaceutical Association many counties of the State will be represented by delegations. The com-committee consists of Messrs. Charles A. Heinitsh, Lancaster; Geo. W. Kennedy, Pottsville; Edw. T. Myers, Bethlehem; Edw. A. Cornell, Williamsport; Geo. W. Kessler, Altoona.

LIQUOR SELLING BY PHARMACISTS.—The Iowa pharmacy law provides that registered pharmacists and "apothecaries . . . shall have the right to keep and sell, under such restrictions as herein provided, all medicines and poisons authorized by the National, American or United States Dispensatory or Pharmacopœia as of recognized medicinal utility." It is, however, further provided it shall not be "lawful for any licensed or registered druggist or pharmacist to retail or sell or give away any alcoholic liquors or compounds as a beverage."

A physician and registered pharmacist of Searsboro sold, last year, a pint of whisky to a man, who stated that he needed it for medicine, and that he was accustomed to taking it. The physician and druggist was prosecuted before a justice of the peace and fined $100. The case was removed to the District Court, and finally to the Supreme Court, which tribunal, on March 22d, affirmed the judgment, holding that, in selling liquors, the druggist must act in good faith, and that, while in form sold as a medicine, it was, in fact, a beverage, and so understood by both buyer and seller.

At the April term the same court rendered a decision holding that the law for the suppression of the unlawful sale of intoxicating liquors was not repealed by the Iowa pharmacy act, except possibly so far as was necessary to allow sales by registered apothecaries of intoxicating liquors for medicine.

ARTIFICIAL CURARE.— Mr. Rabuteau exhibited at a meeting of the Paris Biological Society, held February 25th, a chemical compound which is stated to possess physiological properties closely analogous to those of curare. This compound is the *iodide of methyl-triethyl-stibonium*, $Sb(C_2H_5)_3(CH_3)I$, and is a white crystallizable salt, soluble in water and in alcohol, and having a bitter taste.

The stibethyl compounds were investigated by C. Loewig and E. Schweizer in 1850, those of ethylstibonium by R. Loewig in 1855, and the compounds of stibmethyl and methyl-stibonium by H. Landolt in 1851; their soluble salts have a bitter taste.

ARTIFICIAL QUININE.—A few months ago Mr. Maumené exhibited before the French Academy of Sciences an artificial product stated to possess the chemical properties of quinine, and that physiological experiments

with the new substance were being made. Nothing more has since been learned of the compound, or the process by which it was obtained.

Cinchonas in Guatemala.—We learn from the daily papers that the Guatemalan government has paid Sarg Brothers, English planters in the Coban district, a premium of $1,500 for the successful acclimatization of 2,500 cinchona plants from Peru.

Professor J. E. De Vrij, the celebrated Dutch quinologist, obtained his diploma in pharmacy June 6, 1832. On the semi-centennial anniversary thereof he received from the King of Holland the order of Knight of the Dutch Lion, and was presented, in the name of the pharmacists of the Netherlands, with a silver statue of Hippocrates, placed upon a marble base, to which was attached a medal representing the goddess Insulinda leaning against a red cinchona tree; this was accompanied by a costly album, containing an address and the signatures of 322 pharmacists of the Netherlands.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Proceedings of the Indiana Pharmaceutical Association at the Meetings held in the Masonic Temple, Indianapolis, May 9 and 10, 1882, etc. 8vo, pp. 58.

A report of the meeting will be found on p. 326 of our June number.

Eighteenth Annual Report of the Alumni Association for the Year 1881–82, with the Exercises of the Sixty-first Annual Commencement of the Philadelphia College of Pharmacy. 8vo, pp. 141.

As usual, this report contains the introductory and valedictory addresses, and minutes of the business and social meetings of the association, the proceedings of the latter being reported in full by a stenographer. The pamphlet may be obtained from the Secretary, Wm. E. Krewson, Ph.G.

Practical Medical Anatomy. By Ambrose L. Ranney, A.M., M.D., Adjunct Professor of Anatomy in the Medical Department of the University of the City of New York, etc. New York: Wm. Wood & Co., 1882. 8vo, pp. 339.

This volume, which forms the sixth of the present series of Wood's Library of Standard Medical Authors, is designed to be a guide to the physician in the study of the relations of the viscera to each other in health and disease, and in the diagnosis of the medical and surgical condition of the anatomical structures of the head and trunk. It contains over 155 woodcuts.

The Druggist's Annual for 1882. Compiled by H. G. Adam. New York: Root & Tinker. 8vo, pp. 151.

Intended as a book of reference, this volume contains a large amount of information, valuable to the wholesale dealer, but also much that is of

value to the pharmacist. Statistical tables of importation and exportation, average prices of important articles, statistics of production and trade of various staple products—all these, covering several years, will be found of much interest, as will also the list of duties on imported goods, the average weight or size of original packages, etc. Tables referring to dispensing facilities and to laboratory work, etc., will be found useful in practice. The list of pharmaceutical associations and their officers is quite incomplete. Nearly one-half of the book consists of an exposition of the patents granted in the drug, chemical, oil, paint and allied trades in 1881.

The absence of an index interferes with the ready consulting of the contents, for which no systematic arrangement has been attempted.

Brett's Auckland Almanac, Provincial Handbook and Strangers' Vade Mecum for 1882. Auckland: H. Brett. 8vo, pp. 176.

An interesting book, giving a vast amount of information on agriculture, commerce and other industries of Auckland, New Zealand and the other Australasian colonies of Great Britain.

Transactions of the Medical Association of Georgia. Thirty-second Annual Session, 1881. Augusta, Ga. 8vo, pp. 314.

This volume is handsomely gotten up; the types are large and clear, the paper and printing are good, and the various reports and papers are of general professional interest. About one-fourth of the volume is occupied with mostly brief biographies of deceased members, those of Drs. R. Irvine and Crawford W. Long being accompanied by portraits. For the latter is claimed the honor of having discovered the anæsthetic properties of ether, he having performed surgical operations on March 30, and June 6, 1842, while the patients were under the influence of this anæsthetic.

Ein Gliom. Von Dr. Heinrich Tiedemann, Philadelphia. 8vo, pp. 16.

A glioma.—The pamphlet is dedicated to Dr. von Bischoff, of Munich, on the fiftieth anniversary of his doctorate.

The Metric System of Weights and Measures, adopteed by the U. S. Marine Hospital Service. Ann Arbor: John Moore. 24mo, pp. 44.

A reprint of the tables prepared four or five years ago by Prof. Oldberg.

Report on Ophthalmology, made to the Medical and Chirurgical Faculty of Maryland, April, 1882. By J. J. Chisolm, M.D., Professor, etc. 8vo, pp. 15.

Thirty-ninth Annual Report of the Managers of the State Lunatic Asylum, Utica, N. Y., for the year 1881. Transmitted to the Legislature Jan. 13, 1882. 8vo, pp. 42.

Fourteenth Annual Report of the President of the Inebriates' Home, Fort Hamilton, N. Y., for the Year 1881. Also, a Statistical Report of Six Hundred Cases of Alcoholic Inebriety Treated at the Home from Nov. 1, 1879, to Jan. 1, 1881. By Lewis D. Mason, M.D., Consulting Physician. 8vo, pp. 27.

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SEPTEMBER, 1882.

ARALIA SPINOSA.

By Josiah Kirby Lilly, Ph.G.

From an Inaugural Essay.

Noticing the great differences in the results of former investigations of aralia bark, the writer performed a series of experiments, in hopes of determining the nature of the principles to which the drug owes its slightly aromatic odor, bitterish and acrid taste.

The odor of the bark proved to be due to a volatile oil, present in very minute quantity. By distilling eight ounces of the ground drug with water a few yellowish-green globules of the oil were separated. They possessed an aromatic, somewhat camphoraceous odor, and gave with litmus an acid reaction.

On continuing the distillation, with the addition of solution of potassa, no other volatile principles were observed.

The bitter taste resides in an amorphous, extract-like mass, soluble in ether, alcohol and water, insoluble in petroleum benzin and is not precipitated by neutral or subacetate of lead. The process by which it was obtained is as follows: The drug was exhausted with alcohol, this removed by distillation until the residue assumed the consistence of syrup; this residue was then precipitated in water, the resinous precipitate separated by filtering, and the filtrate evaporated to a soft extract, which was treated repeatedly with stronger ether. The ether solution on being allowed to evaporate spontaneously left a yellow mass, which, when dissolved in water and allowed to stand, separated crystals; the mother water from which, upon being evaporated, yielded the bitter mass already described.

It was also separated from an extract, resulting from the evaporation of a decoction by treating it with stronger ether, and proceeding with this ether solution as with the one above.

The crystals that were separated from the bitter principle possessed a taste which was at first saline, then developing a slight astringency;

they are freely soluble in ether and alcohol, less so in water, and are entirely volatilized at a red heat.

The acrid principle is a resin, which I obtained in the form of a gray powder, possessing a strong and persistently acrid taste, insoluble in ether, soluble in alcohol. It is the resin remaining after treating with stronger ether, the resinous precipitate yielded by the alcoholic extract in water.

The portion of this resinous precipitate which was soluble in ether consisted of a tasteless resin and much green coloring matter, undoubtedly chlorophyll.

In distilling for volatile oil, preparing decoctions, infusions, etc., much trouble was experienced through the formation of a dense and persistent froth. Steps were taken to separate this saponaceous principle with the result of obtaining it in the form of a nearly white powder, inodorous, possessing a slightly acrid taste, freely soluble in water and dilute alcohol, almost insoluble in alcohol, and entirely insoluble in ether and chloroform. A process by which it was isolated is as follows: The extract procured by evaporating a cold infusion was treated with stronger ether to remove the bitter principle, and the residue thoroughly washed with dilute alcohol; this solution was evaporated to an extract and dissolved in water. The aqueous solution yielded with a solution of lead acetate a scanty precipitate, which was separated by filtration. The filtrate gave with solution of subacetate of lead a copious precipitate, which was collected, well washed, the lead removed by suspending in water, and passing hydrosulphuric acid through the solution, and the filtrate evaporated. The product of this evaporation proved to be this saponin-like substance; it was much improved in color by dissolving in a small quantity of hot alcohol, from which it reprecipitated upon cooling, the alcohol holding much of the coloring matter in solution. This principle may also be obtained by exhausting the ground drug with boiling alcohol, from which it separates upon cooling. On boiling this body in a very dilute solution of hydrochloric acid it proved to be a glucoside, yielding glucose and an insoluble white substance.

To this principle I think the name "araliin" could be very properly applied. The araliin of Holden ("Am. J. Ph.," Aug., 1880), is described as "a yellowish substance in scale foaming excessively upon agitation" and is very probably this substance incorporated with some foreign matter.

The alkaloid announced by Elkin (Am. J. Ph., Aug., 1880) as existing

in aralia bark could not be found. No precipitates were formed when Mayer's test, or a solution of iodine in iodide of potassium, were added to an acidulated infusion or decoction, nor to the solution resulting after treating an alcoholic extract with acidulated water.

No reactions were given indicating the presence of tannin. A green color was produced by ferric chloride, but a solution of gelatin caused no precipitate with a somewhat concentrated decoction. Glucose was indicated by Trommer's and Fehling's tests, as was starch by iodine. Milk of lime precipitated pectin from an acid decoction. Albumen was not coagulated upon boiling a cold infusion.

IMPROVEMENT ON TINCTURA ARNICÆ, U. S. P.

By Chas. H. Hæntze.

As the officinal tincture of arnica is very seldom used as an internal medicine, but more so externally, it might be well here to propose a slight imyrovement, deviating somewhat from the U. S. P.: Take of arnica flowers 6 troyounces; alcohol $1\frac{1}{2}$ pint; water $\frac{1}{2}$ pint. First take the arnica flowers and rub in a mortar with 2 drachms of sodium carbonate until quite fine, then take the powder and put in a 2-pound tin percolator of the Rosenwasser pattern, and percolate with the diluted alcohol, raising the reservoir about five feet above the percolator; the result is a quart of dark, clear and strong tincture, and as the quantity of carbonate of sodium is so small it would be hardly objectionable. This same tincture may be made by maceration, but as the latter takes up a great deal of precious time, the former way is preferable. Also the often seen precipitate does not appear in this process.

Preparation of Aniline.—Arau proposes heating a mixture of carbon bisulphide 1 part and ammonia 2 parts to 50°C.; then binitrobenzol is added, and the gas generated is conducted into another vessel containing binitrobenzol; or the vapors given off from the above mixture at 50°C. are conducted through several vessels containing binitrobenzol until this is completely reduced to aniline. The wash water contains ammonium sulphocyanide, and may be utilized for obtaining the potassium salt.—*Chem. Zeitung*, 1882, No. 30, p. 585, from *Monit. Prod. Chim.*, xii, 145.

SOLUBILITY OF COMMERCIAL SULPHATES OF MORPHINE.

By Virgil Coblentz, Ph.G.

An article on this subject appeared in the March number of this journal by Prof. Power, giving the conflicting statements on the solubility of sulphate of morphine, and at the same time making an accurate determination of the solubility of the salt as made by Rosengarten & Sons. The object of this article is the determination of the differences in the degree of solubility of this salt as produced by different manufacturers and found in our markets. The method employed to determine the solubilities is that recommended by Dr. Power, viz.: "An excess of sulphate of morphine was digested with distilled water at 15°C. for several days with frequent agitation, and the solution filtered from the excess of salt (proper temperature being observed), the amount of sulphate of morphine contained therein was determined by precipitation with chloride of barium, and from the ignited amount of barium sulphate the amount of crystallized sulphate of morphine, $(C_{17}H_{19}NO_3)_2.H_2SO_4+5H_2O$, was inversely calculated."

Example.—16·363 grams of cold saturated solution gave ·2650 gram of sulphate of barium, corresponding to ·8625 gram of crystallized sulphate of morphine.

$(BaSO_4)232{\cdot}8:(C_{17}H_{19}NO_3)_2HSO_4+5H_2O)758::{\cdot}2650:x.$ $x={\cdot}8625$ gram morphine sulphate crystallized.

(Solution) 16·336 : (Morph. Sulph.) ·8628 :: 100 : x.

$x=5{\cdot}272$ per cent., and 100 : 5·272 = 18·97 parts of water.

Sample.	Weight of Solution.	Weight of BaSO$_4$	Weight of Morph. Sulph.	One part of the salt soluble at 15°C. in
I.	11·000 gm.	·1580 gm.	·5145 gm.	21·38 water.
II.	21·808 "	·2801 "	·912 "	23·90 "
III.	17·508 "	·232 "	·7554 "	23·18 "
IV.	13·020 "	·226 "	·7359 "	17·69 "
V.	16·363 "	·265 "	·8625 "	18·97 "
Average,				21·00 water.

The samples were those of Powers & Weightman, Rosengarten, Merck, T. & H. Smith, and Chas. T. White.

In round numbers one part of this salt requires from 18 to 24 parts of water at 15°C. for solution.

SOME NEW PREPARATIONS OF THE HYPOPHOSPHITES CONTAINING IRON.[1]

By C. Lewis Diehl.

Several years ago I was requested by a physician to prepare for one of his patients a pleasant combination of the hypophosphites of iron and quinia, if possible, in the form of an elixir, and in as nearly a neutral condition as practicable. After some experiments I succeeded in making a very acceptable preparation—in fact, an elegant elixir, containing in each fluidrachm one grain of each of the salts named, in perfectly neutral combination. The successful production of this preparation led me to apply the chemical facts involved to the production of other combinations of hypophosphites containing iron, some of which have been received with decided favor by the physicians whose attention I have been able to invite to them. Thinking that possibly these preparations may merit more extended use, and that at all events they are interesting combinations, I have concluded to make known their formulas and the methods of their preparation in the following:

So much has been written about the hypophosphites, and there is so much diversity of opinion as to the best mode of their exhibition, as well as of their therapeutic value, that I deem it necessary only to briefly note the points that seem to make it desirable that preparations of hypophosphites containing iron should be prepared as below recommended. The preparation of hypophosphites which has found most favor in this country is the so-called "Churchill's syrup of the hypophosphites." Whether Dr. Churchill's original syrup was one containing only hypophosphite of calcium, as seems to me probable, or whether it conformed to one or the other of the formulas for "syrup of the hypophosphites" proposed by Mr. W. S. Thompson, of Balti-

[1] Read at the meeting of the Kentucky Pharmaceutical Association, in Covington, May, 1882. Reprint from the "Louisville Medical News," communicated by the author.

more, and by the late Prof. Wm. Procter, Jr.,[1] I am unable to decide, but this much is certain, that these two formulas have been authoritative for American pharmacists, though it by no means follows that they have been uniformly followed. The two formulas differ essentially only in that Mr. Thompson directs the *ferrous* salt, while Prof. Procter's formula requires *ferric* hypophosphite. The latter produces a permanent and generally acceptable preparation, the only objection being the presence of free hypophosphorous acid. The preparation of Mr. Thompson, which also contains free hypophosphorous acid, is preferred by some because it contains the iron in the condition of ferrous salt; but the latter is easily changed, and the preparation is therefore not so satisfactory.

In the preparations prepared by me the ferric salt is used, as in Prof. Procter's formula, but instead of effecting its solution by means of hypophosphorous acid, citrate of potassium is employed, a handsome greenish and perfectly neutral solution being formed. The quantity of the citrate necessary for this purpose is about equal to that of the dry ferric salt, but the latter is preferably prepared freshly and dissolved while still moist. The citrates of ammonium or sodium would answer the purpose of solvent as well as the potassium salt, which was selected only because it is always at hand, and because the ammonium and sodium salts are not known to possess any advantage. For the preparation of the ferric hypophosphite any of the soluble salts of the hypophosphorous acid will answer, but I have selected the hypophosphite of calcium, with ferric chloride as precipitant, for the reason that it is the salt most commonly kept in quantities, and because it is the cheapest. Certain precautions must, however, be observed to secure the perfect precipitation of ferric hypophosphite, for if too much or an insufficient quantity of ferric chloride is added, a portion of the hypophosphite remains in solution and is lost during the washing of the precipitate, which must be done with the smallest possible quantity of water. It may be well, therefore, to give particular consideration to the

Preparation of the Ferric Hypophosphite.—Dissolve 150 grains of the hypophosphite of calcium in 4 fluidounces of distilled water, if necessary, by the aid of gentle heat, and filter the solution. To the cold solution carefully add solution of ferric chloride so long as a precipitate is produced. Collect the precipitate upon a close muslin

[1] Parrish's Pharmacy, third edition, 1864, pp. 429, 430.

cloth, drain well, and express firmly; then pour upon the magma one fluidounce of distilled water, and express again. The magma may then at once be dissolved by the aid of citrate of potassium.

When precipitating this compound it is best to add the ferric chloride in small portions at a time and to stir the liquid constantly. Then allow the precipitate to subside, so that the supernatant liquid may become clear before adding the next portion of ferric chloride. Toward the last a small portion of the clear supernatant liquid is removed after each addition and tested with diluted ferric-chloride solution, allowing it to stand for several minutes if no immediate turbidity occurs. If the liquid remains clear after several minutes' standing, the precipitation may be regarded as complete, and the straining and washing may go on as above directed. The product is equal to 128 grains of dry ferric hypophosphite.

Having thus explicitly given the method of obtaining the magma of ferric hypophosphite, these directions do not need repetition in the formulas for the different preparations given below. As regards its solution by the aid of citrate of potassium, it is only necessary to triturate the magma with the specified quantity of the latter, when partial solution will occur, and complete solution follows upon the addition of water, or of the solution of the other hypophosphites.

I. *Improved Syrup of the Hypophosphites with Iron.*—Take of hypophosphite of calcium 256 grains; hypophosphite of sodium 192 grains; hypophosphite of potassium, 128 grains; ferric hypophosphite (represented in the magma obtained from 128 grains of hypophosphite of calcium), 96 grains; citrate of potassium, 96 grains; white sugar, 13 troyounces; orange-flower water, 1 fluidounce; distilled water, a sufficiency. Dissolve the calcium, solium, and potassium hypophosphites in 7 fluidounces of the water, if necessary, by the aid of a gentle heat, and filter the solution. Triturate the magma of the ferric hypophosphite wtth the citrate of potassium, add the solution of the other hypophosphites, and when complete solution is effected, the orange-flower water and sufficient distilled water to make the whole measure 9 fluidounces. In this dissolve the white sugar, without heat, and filter the resulting syrup through paper. A fluidrachm of this syrup contains 2 grains of the calcium, $1\frac{1}{2}$ grain of the sodium, 1 grain of the potassium, and $\frac{3}{4}$ grain of the ferric hypophosphite.

II. *Syrup of Hypophosphite of Iron.*—Dissolve 128 grains of ferric hypophosphite (represented in the magma from 150 grains of hypo-

phosphite of calcium), by the aid of 128 grains of citrate of potassium, in 1 fluidounce of orange-flower water, and sufficient distilled water to make the solution measure 9 fluidounces. In this dissolve 13 troyounces of white sugar, and filter the resulting syrup. 1 fluidrachm of this syrup contains 1 grain of the ferric hypophosphite.

III. *Elixir of Hypophosphite of Iron.*—In the 9 fluidounces of solution of ferric hypophosphite, obtained as above (II), dissolve 4 troyounces of white sugar, and add 5 fluidounces of alcohol, in which 8 drops of fresh oil of orange have been previously dissolved; then filter. The strength of this is the same as that of the syrup, over which it probably possesses no advantage.

IV. *Elixir of Hypophosphite of Iron aud Quinine.*—Make a solution of ferric hypophosphite, as under II, but bring it only to the measure of 7 fluidounces, and dissolve 4 troyounces of white sugar in it. Triturate 128 grains of sulphate of quinine with 5 fluidounces of strong alcohol, add a solution of 30 grains of hypophosphite of calcium in $\frac{1}{2}$ fluidounce distilled water, and shake the mixture occasionally for an hour. Then filter and wash the filter with sufficient strong alcohol to make the filtrate measure 7 fluidounces. In this dissolve 8 drops of fresh oil of orange, add it to the solution of ferric hypophosphite, mix well and filter. A fluidrachm of this elixir contains 1 grain of the hypophosphite of quinine and 1 grain of ferric hypophosphite.

V. *Elixir of Hypophosphite of Iron, Quinine and Strychnia.*—This is the above elixir (IV), containing $\frac{1}{128}$ grain of hypophosphite of strychnia in the fluidrachm, and is made by triturating 1 grain sulphate of strychnia with the sulphate of quinine and alcohol, and increasing the quantity of hypophosphite of calcium by 1 grain.

VI. *Elixir of Calisaya with Hypophosphites.*—This is the "elixir of calisaya" proposed by me in 1866,[1] containing hypophosphites in such proportion that 2 teaspoonfuls represent 1 teaspoonful of "improved syrup of the hpophosphites with iron" (I). It is therefore necessary to reproduce the formula for the elixir of calisaya, as modified for this purpose.

Take of calisaya bark 24 troyounces, curacoa orange peel 16 troyounces, coriander 4 troyounces, cinnamon 3 troyounces, cardamom $1\frac{1}{2}$ troyounce, anise seed 1 troy ounce, cocoa (Baker's) 8 troyounces. Having reduced these ingredients to a moderately fine powder, dis-

[1] "American Journal of Pharmacy," xl, p. 104.

place them with a mixture of 1 volume of strong alcohol and 3 volumes of distilled water, until 2 gallons of percolate are obtained.

Meanwhile prepare from 6 pints of solution of tersulphate of iron, hydrated sesquioxide of iron by the formula of the Pharmacopœia, measure the magma, and add to every 4 volumes 1 volume of strong alcohol; then add of this mixture sufficient to the percolate, obtained as above, to deprive it of its cincho-tannic acid. The absence of the latter is readily ascertained by the addition of a drop of muriated tincture of iron to a filtered portion of the liquid, which should not be colored by such addition. Should coloration result, the intensity or faintness will serve as a guide to the further addition of the ferric oxide. As soon as de-tannation is effected, filter the whole through a *double* muslin cloth, express the residue under a press, filter this portion, add to that first obtained, and measure the united filtrate. Add to the residual magma on the cloth sufficient of the above-described mixture of alcohol and water to make, when again expressed and filtered, the united filtrates measure 3 gallons. Now triturate 2 fluidrachms of fresh oil of orange with 4 troyounces of prepared chalk, incorporate this with the 3 gallons of de-tannated "cinchona liquor," and agitate occasionally for 24 hours, and then filter.

The "cinchona liquor" so obtained is just twice the strength of the "elixir of calisaya" above referred to, and when mixed with an equal volume of "improved syrup of the hypophosphites with iron" forms the "elixir of calisaya with hypophosphites."

VII. *Elixir of calisaya and hypophosphites with strychnia* may be made by dissolving 1 grain of strychnia by the aid of a few drops (or just sufficient) of hypophosphorous acid in 1 fluidrachm of distilled water, and adding sufficient of the above elixir (VI) to make 1 pint. A dessertspoonful contains $\frac{1}{64}$ grain of strychnia.

Acid-proof Cement.—One part of caoutchouc and two parts of linseed oil are melted together and the mass thoroughly mixed with sufficient white bole until the proper consistence is obtained. This cement becomes somewhat softer by heat, is not attacked by hydrochloric or nitric acid, and does not readily harden; to facilitate the latter it may be mixed with one-fifth litharge or red lead.—*Polyt. Notizbl.*

ANALYTICAL RESEARCHES AND INVESTIGATIONS.

COLLATED BY PROF. FREDERICK B. POWER, PH.D.

Estimation of Resin with Fats. By T. S. Gladding.—The author recommends the following method for the quantitative estimation of resin, when accompanied by fats, which is based upon the insolubility in ether of the silver salts of the fatty acids, while the resinate of silver is readily dissolved in large amounts; a small amount of alcohol which may be contained in the ether exerts no objectionable influence.

About 0·5 gram of the fatty acids containing resin is brought into a small flask, 20 cubic ceutimeters of 95 per cent. alcohol added, and the mixture shaken until the fatty acids and resin are dissolved. One drop of a phenolphtaleïn solution is then added, and subsequently a saturated alcoholic solution of potassa, drop by drop, with constant agitation, until the red coloration which designates the excess of alkali becomes permanent. One or two drops of the potassa solution are afterwards added in excess, the mixture maintained at the temperature of boiling alcohol for ten minutes upon the water-bath, in order to ensure the complete saponification of the fat; after being allowed to cool the contents of the flask are washed by means of concentrated ether into a graduated cylinder, holding 100 cubic centimeters, which is afterwards filled with ether. The contents of the cylinder are mixed by agitation, one gram of very finely powdered neutral nitrate of silver added, and the whole actively shaken for 10 or 15 minutes, until the flocculent precipitate of stearate and oleate of silver has aggregated and become deposited, whereupon from 50 to 70 cubic centimeters of the clear liquid, filtered, if necessary, are brought into a second graduated cylinder of the capacity of 100 cubic centimeters. To this liquid a small additional amount of nitrate of silver is added in order to determine whether the fatty acids have been completely precipitated, in which case the liquid will remain clear. 20 cubic centimeters of a mixture of one part of hydrochloric acid and two parts of water are then added, and actively agitated, whereby the complete decomposition of all the silver salt is accomplished, and after being allowed to subside a definite amount of the supernatant etherial resin solution is separated, and evaporated in a platinum capsule on the water-bath to dryness. The residue is then weighed, and consists of the resin, which can contain at the most only traces of accompanying oleic acid.

The utility of the described method has been tested by the author

with mixtures of resin and fatty acids in known proportions, and has proved perfectly satisfactory. It is particularly adapted for the technical examination of soap, to which resin is frequently added, and in this case the previous separation of the fatty acids may be avoided by dissolving the scraped soap directly in alcohol, and proceeding as above described.—*Pharm. Zeitung*, No. 49, 1882, p. 361, from *Chem. News*.

Detection of Salicylic Acid in Foods.—This is usually accomplished by agitating the substance to be examined with ether, benzol or carbon bisulphide. The method is, however, circumstantial, and is not applicable in the presence of fats. The following simple and reliable method, perfected in the laboratory of the "Chemiker-Zeitung," is based upon the volatility of salicylic acid with aqueous vapor. If a liquid, wine, beer, milk, etc., is to be examined, about 100 cubic centimeters of the same are brought into a flask connected with a Liebig's condenser, and distilled as quickly as possible. A few drops of the distillate are collected from time to time, and tested with pure, neutral ferric chloride; if a violet coloration ensues, salicylic acid is present. From dilute solutions the salicylic acid does not distil so readily as from concentrated. A liquid, *e. g.*, which contained 0·005 per cent. of salicylic acid gave in the first half of the distillate only a very feeble reaction, while two drops of the following portion assumed with ferric chloride an intense violet color. Salicylic acid is not volatile with alcohol vapors, and likewise not in the presence of tannin; in the latter case, and when contained in red wine, it suffices to acidulate with sulphuric acid in order to obtain perceptible amounts of salicylic acid in the distillate.

If non-volatile substances, such as butter, are to be examined a sufficient amount is brought into a flask, an active current of steam led through the mass, and the distillate tested as above. With slight traces of salicylic acid which are no longer detectable in the distillate by ferric chloride (0·0005 gram dissolved in 100 cubic centimeters of water yields an intense coloration), a large amount of the distillate is slightly supersaturated with ammonia, and evaporated on the water-bath to dryness. The residue is then dissolved in a little water, and tested with ferric chloride; if the violet coloration does not now appear the absence of salicylic acid is proven.

It is still to be observed that the violet coloration does not appear in the presence of free acids, alkalies, or large amounts of salts.—*Chem. Zeitung*, No. 32, 1882, p. 619.

ANALYSIS OF WINE.

BY J. NESSLER AND M. BARTH.

I. *Determination of the Amount of Extract.*—The methods at present in use for the determination of the amount of extractive in wine differ from one another not only in subordinate details, but also in principle, according as extract is understood to mean the constituents of the wine absolutely non-volatile without decomposition, or the wine deprived of its water, alcohol and volatile acids. In the former case it is especially necessary to volatilize the glycerin completely without partially decomposing the non-volatile constituents of wine through submitting them to too high a temperature. Determinations of extract in this manner are usually made with only a small quantity of wine (5 or 10 cc.), which is heated upon a water-bath so long as water is perceptibly driven off, and the drying is then continued in an air-bath at 110° C., or preferably *in vacuo* until the weight remains constant. The other kind of determination has for a special object the retention of the glycerin as completely as possible in the extract. This can be effected either by avoiding raising the temperature above 100°, or by making an addition to the wine which will prevent the volatilization of the glycerin at a temperature of from 110° to 115°C.

In estimating a wine extract the authors concentrate 50 c.c. of the wine to a syrupy consistence on a water-bath, and then further dry it for three hours at the temperature of boiling water. In order to maintain this temperature exactly they used a jacketed apparatus, arranged like a paraffin drying chest, the interspace being filled with boiling water, and made sufficiently large for the water to be maintained in vigorous ebullition during four hours without exhaustion.

In order to ascertain whether in this process access of air exercised an essential influence upon the weight of the extract parallel experiments were made in which 25 cc. of wine were placed in each of two platinum boats, enclosed in test-tubes, and arranged so that whilst side by side in the above-mentioned drying chamber a current of dried coal gas could be passed over one and a current of dried air over the other. A thermometer fixed in the drying chest showed that when the water was boiling vigorously the temperature in the interior was 100°C. After heating for eight and ten hours the residue was weighed with the following results:

	Eight hours.	Ten hours.
Current of coal gas, ...	1·84 per cent.	1·80 per cent.
Current of air, ...	1·90 "	1·86 "

The difference between the results of the two estimations is probably due to the extractive matter in the one case taking up oxygen from the air; but it is not considered sufficient to constitute an essentially larger quantitative result in drying under access of air than in a current of coal gas.

If the wine be first evaporated upon a water-bath in an open platinum dish to a syrupy consistence it only requires to be heated for three hours in the drying chest before reaching a point where the difference between two weighings is dependent entirely upon the volatility of the glycerin. Experiments made to determine the extent of this volatility showed that it amounted to about 10 per cent. of the glycerin present during the evaporation on the water-bath and another 4 per cent. in the drying chest. So that a wine containing 1 per cent. of glycerin would lose about 0·14 per cent. through its volatilization during evaporation and drying; but in a low wine, which with 5 or 6 per cent. of alcohol would probably contain only 0·4 per cent. of glycerin, the loss would only amount to 0·05 per cent. If, however, the extract be dried at 110°C., experiment has shown that in this part of the operation alone, in three hours, about 10 per cent. of the glycerin present is driven off, so that at the end of the drying the total loss is considerably larger than in drying at 100°C.

Alteration in the other constituents of the extract is relatively small when the drying is effected at 100°C. Fifty cc. of wine, containing 0·47 total acids, was evaporated to the consistence of a syrup, then heated further for half an hour upon a water-bath, after which the non-volatile acid amounted to 0·36 per cent. The extract of the same wine after drying three hours at 100° showed upon titration 0·28 per cent.; that dried at 110°C. showed 0.22 per cent.; and that dried at 120° C. 0·11 per cent. of non-volatile acid.

Grete has recommended that in order to obviate the decomposition of the non-volatile constituents of the extract during drying, and especially to entirely prevent volatilization of glycerin, the wine should be evaporated with a measured quantity of titrated baryta water. Some experiments have been made by the authors to determine (1) whether an indifferent body like glycerin actually enters into chemical combination with caustic baryta so as to be no longer volatile at 110°C.;

and (2) whether, if this be the case, the quantity of extract usually present in 10 cc. of wine is sufficient to combine chemically with the whole of the baryta in 10 to 15 cc. of baryta water of ordinary strength, so that in the dry residue no barium hydrate shall be present, since the reckoning of a variable amount of it as BaO would affect the result. An Alsace wine of 1876 was used, and it was found that the first of these questions must be answered in the affirmative, 0·489 per cent. out of 0·5 per cent. of added glycerin being recovered. As to the second, it was found that when 10 cc. of baryta water was used it was certainly all combined, and that this was also the case with 15 cc., unless the wine was particularly poor in extract. The partial decomposition of the nitrogenous organic constituents, which is made evident by the odor of trimethylamine when the extract containing baryta is heated, does not appear to exercise any essential influence upon the weight of the extract, whilst the acids of the wine, in the form of barium salts, better resist decomposition at a high temperature than in the free state.

This method has, however, the disadvantage that the same wine would be made to appear considerably richer in extract by the presence of traces of acetic acid, because whilst this would have been produced from the alcohol, it would be weighed with the extract. But the purpose of the adulterator, who had added glycerin to make up for the want of extract in a wine which had been diluted before fermentation with alcohol and water or sugar and water, would be thus served, as the extract would be brought up to the normal quantity, whilst in external characters the extract containing baryta from a diluted wine that has been treated with glycerin does not differ from that of a natural wine. In practice, therefore, in many cases an estimation of the acetic acid and glycerin would also be necessary. As previously mentioned, by far the greater portion of the glycerin present in wine is retained in the extract. A wine, therefore, to which any considerable quantity of glycerin had been added would yield an extract that is soft and viscous even after three hours' drying, whilst the extract from a natural wine is hard and generally bulky and blistered, or at the most,—where the wine is strongly alcoholic through fermentation, which increases the normal quantity of glycerin,—is plastic, somewhat like hard dough.

Hager has compiled a table[1] by the help of which the amount of

[1] "Zeitschrift f. analyt. Chemie," xvii, 502.

extract in a wine can be ascertained from the specific gravity of the liquid after being deprived of alcohol. In almost all the completely normal wines the quantity of extract found by the above method corresponded within two to three hundredths per cent. to that indicated by Hager's table. If the wine contains sugar still unfermented, or unfermentable constituents of potato sugar, then usually the extract calculated is somewhat higher than what is found; but if, on the contrary, it contains an abnormal quantity of glycerin the extract calculated is considerably less than what is actually found. Therefore, it is always advantageous to compare the amount of extract calculated according to Hager's tables with that found by the method described. This method does not do away with the necessity for an estimation of the glycerin itself in such wines as may be suspected to have received an addition of glycerin.

The authors have applied this method in the estimation of the extract of several hundred kinds of undoubtedly genuine wines of different years and from widely separated districts. The results of these determinations are set out in a tabular form in a separate communication.[1] It was found that the absolute quantity of extract in pure natural wines may vary within very wide limits. Among other conditions exercising an essential influence upon it are the nature of the soil of the district in which the wine is grown, the situation of the particular vineyard, the weather, degree of ripeness of the grapes, the course of the fermentation, and unskillful treatment of the wine, which may induce a considerable alteration in the composition of the extract without any foreign addition being made.

The amount of extract present in pure, completely fermented wine stands in definite relation to the acid present. It amounted in none of the genuine wines examined by the authors, after the deduction of the free acid of the wine, to less than 1 per cent. It may happen that a genuine wine may contain less than 1 per cent. of extract free from acid; but in such cases the *non-volatile* acid is determined, and after deducting this fixed acid from the total extract there is always a residue, amounting to at least 1·1 per cent. The estimation of the fixed acid is made with sufficient exactitude by evaporating 20 cc. of the wine to a syrupy consistence, heating it further for half an hour to an hour on a water-bath, subsequently treating it with hot water and titrating after it has cooled.

[1] "Zeitschrift f. analyt. Chemie," xxi, 198.

But a larger proportion of extract than 1 per cent. after deduction of total acids may be expected—

(1) In wines which contain much sugar still unfermented, but in which from any cause fermentation is stopped. The fully fermented dry wines usually still contain a small quantity of sugar, which may vary between 0·01 and 0·001 per cent. The minimum of extract free from acid to be expected in a natural wine would exceed 1 per cent. by as much as the quantity of sugar as ascertained under suitable precautions by means of Fehling's solution exceeds 0·1 per cent.

(2) In wines from certain districts which are known by experience to produce in their best years a relatively full-bodied wine.

(3) In red wines. In these the smallest amount of acid-free extract is usually 1·2 per cent.; but in "berry wines," and in such red wines as have stood only for a very short time over the husks and stalks, the minimum is exceptionably 1 per cent.

Wines rich in ash also stand higher in respect to amount of extract. If a wine yields much ash and gives relatively little extract, and if in addition the ash is easily fusible and not blackened by incineration, then the authors think there is reason to suspect that the wine consists partially of the product of fermentation of a solution of sugar over wine residues.

Provided that the total amount of extract, free from ash and sugar, does not sink below a certain quantity, it may vary very considerably in composition according to the quality of the wine. For instance, since glycerin is a by-product of fermentation, and may amount to from 7 to 10 per cent. of the weight of alcohol produced, a clear natural wine, rich in alcohol, would evidently contain more glycerin than one poor in alcohol. Another portion of wine extract consists of pectin bodies, which occur, however, in less quantity in proportion to the ripeness of the grapes used in making the wine. Very ripe grapes, rich in sugar, leave after fermentation relatively much glycerin and little pectin substance, while with unripe, very acid grapes, poor in sugar, the contrary is the case.

The ash constituents amount on the average to about 10 per cent. of the entire weight of the extract, but this amount is not an indispensable characteristic of a pure wine, since it may be affected by various conditions. For instance, a wine may be rich in extract, but not in ash, when it contains a considerable quantity of unfermented sugar; or the ash may be low through separation of tartar not only when a wine

contains much alcohol, but when it has been exposed for a long time to a low temperature, which causes a separation of the tartar in crystals that do not redissolve on the normal temperature being restored. The total amount of ash found by the authors in genuine wines did not fall below 0·14 per cent.

II. *A Modification of Neubauer's Test for Potato Sugar in Wine, and the Optical Behavior of Pure and Saccharated Wines.*—Neubauer's method for the recognition of an addition of potato sugar to wine or must is based upon the optical behavior of the wine in a polarimeter. Whilst pure natural wine, which contains unfermented fruit sugar, rotates the plane of polarized light to the left, and completely fermented wine is quite neutral in its behavior or rotates the plane only a few tenths of a degree of Wild's scale to the right, a fermented potato solution has a considerable residue of strongly dextrogyre constituents, which are not sugar. According to recent experiments by the authors with various kinds of commercial potato sugar, even the best qualities, pure white and in crystalline granules, contain from 15 to 18 per cent. of unfermentable substance, each 1 per cent. of which, in 200 mm. tubes, has a dextrogyre action of 1·5° (Wild). Consequently 1° of rotation by the fermented wine due to this cause would, on the average, correspond to an addition of 4 kilos of potato sugar to the hectoliter of wine. In the presence of unfermented sugar this result would be modified: 1 per cent. of sugar rotates about 1·25° to the right, so that 1° of rotation, due to unfermented potato sugar, would correspond to about 800 grams of chemically pure grape sugar in the hectoliter. But inferior kinds of potato sugar contain from 26 to 30 per cent. of the unfermentable substances, which do not reduce Fehling's solution.

As before mentioned, wine frequently contains a small quantity of a dextrin-like constituent, capable of exercising a slight dextrogyre action amounting to 0·03° to 0·6° (Wild). But this substance is almost completely insoluble in alcohol, whilst the greater portion of the dextrogyre residue from fermented potato sugar is soluble in 90° alcohol. Upon this fact Neubauer based a method of distinguishing between the slight dextrogyre action of a normal wine and that of one containing potato sugar. The method, however, has the defect of admitting the possibility of the result being affected by the presence in the test solution of free tartaric acid, which also has a dextrogyre action. It is, therefore, proposed by the authors to modify it as follows:

210 cc. of wine, after the addition of a few drops of concentrated solution of potassium acetate, is evaporated to a thin syrup, treated with 90° alcohol, the alcoholic solution decanted when perfectly clear or filtered, water added, and the liquid decolorized with animal charcoal, evaporated to about 15 cc., filtered, the filter washed and the filtrate brought up to 30 cc. (one-seventh of the original volume of the wine) and polarized. If the resulting liquid shows a rotation of more than 0·6° (Wild) the wine may be considered with certainty to contain potato sugar.

If a wine contain non-inverted and unfermented cane sugar, which would probably have been added to it after fermentation to increase the amount of extract, the dextrogyre action of such a wine would be changed into a levogyre action during the evaporation even by the influence of the natural acids, but more certainly if a few drops of hydrochloric acid be added. The presence of unfermented cane sugar would therefore be indicated when a wine first shows a dextrogyre action and then after evaporation with hydrochloric acid shows a corresponding levogyre action.

A 6·5 per cent. solution of cane sugar, which rotated 8·4° to the right, was heated in a water-bath during three-quarters of an hour with some hydrochloric acid, brought to its original volume and polarized, when it showed a left-handed rotation of 2·2°. In order to test whether the inversion was quite completed, this solution was now kept in active ebullition for half an hour, evaporated water being restored as far as possible; it had then acquired, without any perceptible charring, a wine yellow color, and having been brought to its original volume, showed a left-handed rotation of 1·7°. A sugar determination with Fehling's solution gave 5 per cent. of invert sugar. It follows that a 1 per cent. aqueous solution of invert sugar rotates about 0·34° to the left (1 per cent. cane-sugar solution rotates about 1·3° to the right); that the inversion of a tolerably large amount of sugar is completely effected in three-quarters of an hour on the water-bath; and that by longer heating to a little over 100°C. (*i. e.*, to the boiling point of the sugar solution) a portion of the resulting invert sugar is again decomposed. When small quantities of cane sugar are present the natural acids of the wine are sufficient to effect complete inversion during heating; but with larger quantities (1 per cent. and upwards) it must be assisted by a little hydrochloric acid. As soon as cane sugar in wine

has completely fermented its addition to the must can no longer be detected by optical means.

The question whether an addition of caramel to a wine exercises any influence upon its optical behavior has been answered in the negative by the authors' experiments, caramel proving to be optically inactive.

III. *Chlorine Determination and the Amount of Chlorine in Wine.*—It is known that in the estimation of wine by experts an essential value is placed, among other things, upon the amount of ash found in it, and that manipulations for increasing its bulk considerably lower the proportion of incombustible substances that it yields. In order to cover this poverty of ash constituents an addition is often made of such salts as will remain completely dissolved in the wine and hence not raise suspicions, and for this purpose an addition of common salt to a sophisticated wine is not very extraordinary. But it is more common to use water from a spring rich in residual matter, by which means the lowering of the ash constituents through dilution of the wine is much lessened. Such waters, however, are often very rich in chlorine compounds, and therefore the estimation of chlorine in wines is not unfrequently of especial interest. But isinglass occasionally, though not very often, contains some added salt, so that the presence of a sophistication cannot be assumed with certainty upon the single ground of the occurrence of a somewhat too large quantity of salt.

All wines that contain abnormal quantities of common salt are distinguished by the ash not burning white so easily as that of most other wines: it pertinaciously retains carbon, and upon using a very strong heat in incinerating it probably fuses and a large portion of the alkaline constituents is volatilized. If the incineration residue be left to cool, treated with water so as to separate the salt from the carbonaceous particles, and then heated carefully so as to avoid spirting (a characteristic of common salt), a pure white ash will probably be obtained, but it will not contain all the salt. Further, if the extract be simply carbonized and then treated with water, the residue from the evaporation of the liquor cannot be looked upon as containing all the sodium chloride as such; because the organic acids of the wine, immediately upon being heated, and before they are decomposed, expel a considerable quantity of hydrochloric acid and eventually form carbonates. Consequently a chlorine determination of ash produced as carefully as possible gives the amount of chlorine compounds in a wine too low.

In the estimation of chlorine in original wines those quantitative

analytical methods which depend upon the use of potassium chromate as an indicator are not available, because the red-brown silver chromate is not insoluble in the free acids of wine. The previous neutralization of the wine results in the production of color during the reaction, which prevents the commencement of the end reaction from being distinguished with the necessary sharpness.

In using Volhard's method of determining chlorine white wine must be first decolorized with animal charcoal free from chlorine compounds, as the yellow tannin-like substances of the wine will produce with the ferric salt used as an indicator an intensely dark-green or black color, and even by this decolorization the production of color in the wine upon the addition of ferric salts, silver solution and potassium sulphocyanide cannot be entirely avoided.

A slight modification of Volhard's method induces a sharp end reaction and gives exact results. 40 to 50 cc. of decolorized wine is acidulated with nitric acid and treated with excess of titrated silver solution and titrated solution of potassium sulphocyanide added gradually, until a drop of the liquid allowed to fall into a drop of dilute solution of a ferric salt (iron alum) upon white porcelain shows a distinct red color. If the quantity of potassium sulphocyanide solution required be large, the experiment should be repeated, taking as small an excess of silver solution as possible. Twenty-five undoubtedly genuine wines from different districts (including five red wines) were examined for chlorine, and it was found that the normal amount of chlorine in wine does not exceed 0·005 per cent., whilst in most wines it is below 0·002 per cent. Five genuine "Markgräfler" wines, of the years 1822, 1862, 1868, 1870, and 1875, showed an amount of chlorine varying between 0·002 and 0·0025 per cent. Italian and similar wines, grown in the neighborhood of the sea-coast, frequently yield an easily fusible ash that does not burn perfectly white; but none have yet been observed in which the amount of chlorine exceeded 0.006 per cent. At Carlsruhe several wines have been examined in which the chlorine amounted to 0·03 per cent., representing 0·05 per cent. of common salt, or 25 per cent. of the entire ash.

IV. *Detection of Free Tartaric Acid in Wine.*—If 100 cc. of wine be evaporated to a thin syrup, and this, while kept stirred, be treated with strong alcohol until a fresh addition of spirit no longer causes precipitation, all the tartar will separate within two hours and the alcoholic solution will contain the free tartaric acid. The alcohol is

evaporated, the residue taken up with water, the somewhat turbid liquid cleared by the addition of pure washed animal charcoal,[1] filtered, and the filtrate, which may amount in volume to one-tenth of the original wine, treated cold with 1·5 to 2 cc. of a 20 per cent. solution of acetate of lime. A wine, which tested according to Berthelot and Fleurieu's method is found to contain no free tartaric acid, does not show the slightest turbidity when treated in the above manner. Wines containing 0·05 per cent. of free tartaric acid show after a short time a crystalline separation, and after half an hour a distinctly crystalline granular deposit on the sides and bottom of the containing vessel; in two hours the separation is considerable, after which it does not perceptibly increase. An amount equal to 0·01 per cent. gave in two hours distinct crystals of tartrate of lime. The presence, however, of so small a quantity of free tartaric acid is of little consequence in judging a wine. Wines from unripe or partially unripe grapes contain free tartaric acid; but according to the results of experiments on wines from most diverse districts it never exceeds one-sixth of the non-volatile acids present.

V. *Estimation of Citric Acid in Wine.*—Citric acid is sometimes used as an addition to the acid in an excessively diluted wine, either in substance, or, if it be desired to give to the beverage at the same time body and the appearance of old wine, in the form of tamarinds, in which it is present in considerable quantity. The estimation of citric acid in wine has, therefore, considerable interest.

For the detection of citric acid the characteristic behavior of its lime salt can be used, it separating in a crystalline form upon prolonged boiling of the aqueous solution; but the citric acid must previously be separated as much as possible from other acids and the special extract constituents of the wine, since citrate of lime remains dissolved in the neutral saline solutions of most acids. After many unsuccessful experiments the following method was found to give useful results.

100 cc. of wine being evaporated to about 7 cc., it is allowed to cool and then treated with 80 per cent. alcohol; after standing about an hour the undissolved matter is removed by filtration, the alcohol evaporated off, water added to bring the residue up to 20 cc., part of the acid neutralized with a thinnish milk of lime (red wine requires

[1] The charcoal must be boiled with hydrochloric acid and washed, so that whilst moist it shall have a perfectly neutral reaction, and contain scarcely any salts, especially phosphate.

here an addition of some washed animal charcoal), and then filtered. The filtrate, which must still be distinctly acid, is brought up to the original volume of the wine with water, and 0·5 to 1 cc. of a cold saturated solution of neutral acetate of lead added and very briskly agitated. The lead precipitate contains a portion of the malic acid (another portion remains dissolved as an acid salt in the dilute acid liquid), phosphoric acid, a trace of sulphuric acid, tartaric acid and citric acid. It is filtered off, washed with cold water, placed together with the filter in a closed retort containing water saturated with sulphuretted hydrogen and energetically shaken and thus decomposed. After standing some time the perfectly colorless, clear liquid, which contains the above-mentioned acids, is filtered off, washed with water containing sulphuretted hydrogen, the sulphuretted hydrogen driven off by evaporation, and the liquid, amounting to about 15 cc., made faintly alkaline with thin milk of lime, so as to separate phosphoric acid, then filtered, the filtrate acidulated with the smallest possible quantity of acetic acid, and by standing from half to one hour the tartaric acid present sufficiently removed as tartrate of lime. The liquid is then evaporated to dryness to separate free acetic acid, the residue taken up with hot water, and this concentrated until the separation of the crystalline citrate of lime. After being once separated it is no longer soluble in hot water; it is filtered off, washed hot, dried and weighed. The salt has the composition $(C_6H_5O_7)_2Ca_3+4H_2O$. In this way, in a case where 20 mg. of citric acid had been added to a wine a precipitate corresponding to 13 mg. of citric acid was obtained.

In a specimen of commercial tamarinds 13·5 per cent. of citric acid was found.

Most of the natural wines tested were found to be free from citric acid. Some of them contained traces; as, for instance, a white Alsace wine of 1878, and a white Italian wine of 1880. But the amounts of citric acid in these wines only amounted to between 0·003 and 0·002 per cent.—*Phar. Jour and Trans.*, July 15, 1882; *Zeitsch. f. Anal. Chem.*, xxi, 43.

Glycerite of birch tar has been successfully used in eczema by E. Johanson; it was prepared by mixing one part of birch tar with eight parts of glycerin, the latter previously diluted with one-fifth water.—*Phar. Zeit. Russl.*, No. 21.

AMMONIACAL CITRATES.

By E. Landrin.

It is well known that many metallic oxides and citrates, insoluble in water, are soluble in the alkaline citrates, even in the presence of reagents, which under ordinary conditions precipitate these oxides. This phenomenon has been made the basis of a quantitative method for the determination of phosphoric acid. Some years ago, Spiller ("Pharm. Journ.," 1858) carried on a series of investigations, in order to study the influence of citric acid in preventing the precipitation of the metallic oxides, and arrived at the general result that the neutral citrates possess the property of combining with other salts to form a class of compounds of the general formula $M'_3C_6H_5O_7 + 3M'_2SO_4$, in which sulphuric acid may be replaced by carbonic, chromic, or boracic acids. For instance, solutions of these compounds are not precipitated by barium nitrate until a slight excess of sodium sulphate is present. Lebaigue (1864), however, considers that these phenomena are due to an interchange between the acids and bases, which is stable only so long as the citrate liberated in the nascent state is soluble, and thus the peculiar characteristics of the acids and bases present become apparent when the nascent citrate has saturated the alkaline citrate, viz., when the precipitant is in excess of the alkaline citrate. Further, the insoluble citrates are dissolved in the alkaline citrate in definite proportions, and citric acid being tribasic can saturate not only three equivalents of the same, but also of different bases to form soluble salts.

In order to decide between these views, the author has taken up the question, and has arrived at results in accordance with those of Lebaigue, *i. e.*, citrates insoluble in water dissolve in alkaline citrates, with formation of double salts of the composition $M_2M'C_6H_6O_7$, in which M is an alkali-metal, and M′ a metal belonging to some other class.

This result receives support from the following experiments: If barium carbonate is gradually added to citric acid saturated with ammonia until one equivalent of acid and baryta are present, a clear solution is obtained, from which, on cooling, normal barium citrate separates out. The supernatant liquid contains in solution a double ammonium barium citrate. Analogous phenomena were observed with the oxides of calcium, strontium, lead, and cadmium. Again, if aluminium hydroxide be dissolved in ammonium citrate, and the solution evaporated over sulphuric acid, white crystals of a double ammonium

aluminium citrate, $3C_6H_5O_7(NH_4)_2H + [C_6H_5O_7(NH_4)_2]_3.Al_2 + 6H_2O$, will separate out. A similar iron salt was obtained, a solution of which gives no precipitate with succinic and benzoic acids, no coloration with potassium thiocyanate, and no precipitate but only a green coloration with potassium ferrocyanide. The author also prepared and analyzed analogous double citrates of ammonium and magnesium, manganese, nickel, cobalt, zinc, copper, and mercury, but was unable to obtain salts of antimony, bismuth, tin, or silver.—*Jour. Chem. Soc.*, June, 1882; from *Ann. Chim. Phys.* [5], xxv, 233.

OCCURRENCE OF SUCCINIC ACID IN AN INCRUSTATION ON THE BARK OF "MORUS ALBA."

By G. Goldschmidt.

The author had often observed on the stems of mulberry-trees, both young and old, the exudation of a liquid, which dried up to crystalline crusts, especially on the side exposed to the wind. This liquid, which has a saline taste, was found to consist of a solution of calcium succinate, C_4H_4OCa, which, after several recrystallizations with the aid of animal charcoal, melted at 180°, and was converted by distillation into the anhydride melting at 160°. The liquid also contained a small quantity of calcium carbonate.

The occurrence of exudations on mulberry-trees was observed long ago by Klaproth, who regarded them as consisting of the calcium salt of an acid which he called "Maulbeerholzsäure," and similar observations were afterwards made by Landerer. Gmelin, "Handbook," Engl. Ed., 8, 109) suggests that the acid found by these chemists was nothing but succinic acid, a suggestion which is corroborated by the observations above mentioned.

The occurrence of succinic acid in the juices of a large number of herbs has long been noticed; but it has not hitherto been found in liquids exuding from trees; and this circumstance, together with the observation that on all parts of the bark where the exudation occurred, a brown humus-like substance was also found, induced the author to think that the succinic acid in this case might perhaps be, not a physiological secretion, but the product of a pathological process.

To throw light on this question, he submitted the humus-like substance to the examination of Professor Wiesner, who found it to consist of dried plasmodia and sporiferous receptacles of a myxomices,

most probably a species of Aethalium. The plasmodia of myxomicetes are, according to Reinke ("Studien über das Protoplasma"), very rich in mineral substance containing a large proportion of lime. Succinic acid was not found in them by Reinke. The occurrence of the succinic acid is perhaps due to a fermentation process, in consequence of which the malic acid occurring in the juices of the mulberry-tree (Gmelin, 10, 206) is converted into succinic acid, a metamorphosis, which, according to Fitz ("Ber.," 12, 481) takes place somewhat readily in schizomycetic fermentations, and may be represented by the equation: $3C_4H_6O_5 = 2C_4H_6O_4 + C_2H_4O_2 + 2CO_2 + H_2O$.—*Journ. Chem. Soc.*, June, 1882; from *Monatsch. Chem.*, iii, 136.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

Willow Galls, from Salix nigricans, *Fries*, have been examined by Edwin Johanson. They were externally felt-like and spongy, bore at their upper end a cluster of stunted leaves, and had formed on the tender branches, which had thereby become stunted, and within the galls enlarged and sponge-like. The etherial extract of the concentrated aqueous infusion was fat-like, non-crystalline, and contained only traces of tannin-like compound. The lead precipitate from the aqueous infusion contained tannin, giving a green-black precipitate with ferric chloride. The filtrate from the lead precipitate contained no sugar; but the corresponding liquids obtained from the branches and leaves gave reactions for sugar. The alcoholic tincture prepared from material previously exhausted by water indicated by its reactions the presence of bodies related to quercitrin and catechin. Compared with the branches and leaves, the galls had a very similar composition and contained only a somewhat larger quantity of tannin.—*Phar. Zeitsch. Russ.*, 1882, p. 455—463.

Resin of Pine Cones.—The cones of Pinus Abies, called *elata* in Greece, secrete during hot weather an oleoresin called *elatopyssa*, which congeals in mastich-like tears, and, according to Landerer, is popularly employed in the form of pills and decoction in coughs, bronchitis, and in diseases of the bladder. The cones with the tears are not unfrequently kept in rooms on account of their balsamic fragrance.—*Zeitschr. Oest. Ap. Ver.*, 1882, p. 170.

Relation of Starch to Atropine in Belladonna Root.—F. Buddel has

examined several lots of belladonna root by exhausting with very diluted sulphuric acid, adding baryta, and evaporating to a syrupy liquid; this was taken up with alcohol, again evaporated, dissolved in dilute sulphuric acid, agitated with petroleum benzin to remove fat, then rendered alkaline by ammonia and agitated with chloroform; the chloroform solution, when evaporated, left the atropine, and, after weighing, this was titrated with tenth-normal solution of Mayer's test:

1. Fresh belladonna root, free from starch, yielded ·125 per cent. atropine, or ·625 per cent. calculated for the dried root.

2. Fresh root, containing starch, yielded ·2 per cent. of atropine, or 1 per cent. for dry root.

3. Root, free from starch, collected in 1878, yielded ·29 per cent. atropine.

4. Root like preceding, collected 1879, yielded ·15 per cent. alkaloid.

5. Very starchy root, collected 1879, yielded ·41 per cent. atropine.

6. Non-starchy root, collected 1881, gave ·143 per cent. atropine.

The author concludes that starchy belladonna roots contain more atropine than non starchy roots, and explains the difference between samples 1 and 5 by the latter having been on hand for over a year when analyzed. He is also inclined to regard the non-starchy roots as having been derived from young plants.—*Arch. d. Phar.*, June, 1882, pp. 414–416.

Falsification of Arnica Flowers.—Ch. Ménier has examined a commercial sample of what was offered as arnica flowers, and was found to consist altogether of the flowers of Inula britannica, *Lin.* When seen in bulk these flowers somewhat resemble those of arnica, but the two may be readily distingnished by the following characters:

Arnica montana.	*Inula britannica.*
Heads, large, single.	Heads smaller, 2 or 3 in a lax corymb.
Involucral scales 16 or 18, equal, imbricated in two rows, lanceolate, hairy.	Involucral scales equal, narrow, linear, long-pointed.
Receptacle finely alveolate, chaffy,	Receptacle flat, naked.
Ligules orange.yellow, with 9 to 11 veins.	Lingules yellow, 4-veined.
Anthers naked at base.	Anthers with two filiform appendages at the base.
Akenes brown, stiff hairy.	Akenes hairy.
Odor characteristic.	Odor, none, or very feeble.

This substitution appears to have been practiced for a long time, and

not unfrequently the flowers of the two plants may be found mixed.

Inula dysenterica, *Lin.*, which resembles the above species, is distinguished by its double pappus, the outer row being very short, coroniform, toothed, or split to the base, and by its slightly alveolate but otherwise naked receptacle.—*Jour. Phar. et Chim.*, June, 1882, pp. 611, 612.

Test for Distinguishing Cotton-seed Oil from Olive Oil. By M. Zecchini.—The author recommends for this purpose pure colorless nitric acid, free from nitrous products, and having a density of 1·40. Acid of this strength forms with pure olive oil at first sight a colorless or slightly straw-colored mixture, changing to light dove-grey with yellowish reflex, whereas with cotton-seed oil it forms at first a golden-yellow mixture, afterwards changing to a coffee-brown color so deep as to be almost black. To apply the test, the two liquids are mixed in a test-tube closed with a caoutchouc stopper, and shaken together briskly for about half a minute, the tube being then left to rest in a vertical position for five or six minutes. This method serves for the detection of 0·5 per cent. cotton-seed oil in olive oil. It is essential to use acid of the strength above mentioned, for weaker acid, *e. g.*, of sp. gr. 1·22 to 1·33, produces with cotton-seed oil only a light colored liquid, scarcely distinguishable from that formed with olive oil; while on the other hand strong acid having a sp. gr. of 1·40 and charged with nitrous products gives a dark color even with pure olive oil.—*Jour. Chem. Soc.*, June 1882, from *Gazzetta*, 1882, 61.

Artificial Amber, closely resembling the natural product, is made chiefly from colophony; it softens at a much lower temperature, and becomes at once opaque and gradually soft in alcohol. True amber melts between 285 an 287°C.; alcohol acts scarcely upon it, and fragments of it are united to larger pieces by moistening the surfaces with potassa and pressing them together.—*Polyt. Notizbl.*

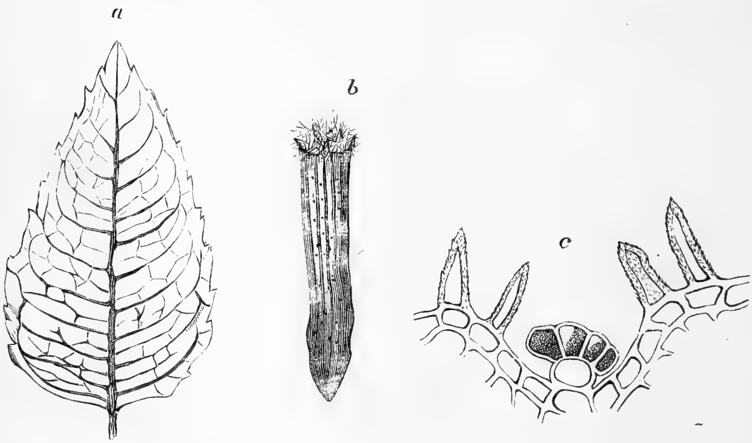
Oil of Thyme is conveniently tested for thymol, according to Hager, by spreading a half a drop of it, by means of a small cork, upon a glass slide, so as to occcupy 4 or 5 square centimeters. The thymol begins to separate, within 3 or 4 minutes, in the central portion of this liquid, in numerous minute bodies, recognizable with the naked eye; subsequently they appear also towards the margin, but less numerous. Under the microscope they appear at first amorphous, but after an hour or two are easily recognized as crystals.

For the separation of thymol by means of caustic soda it is neces-

sary to distil the oil, collecting the fraction up to 220°C., and treating the residue with hot soda lye.

Or 2 volumes of the colorless oil are dissolved in 6 volumes of ether; add to this solution 1 volume of concentrated sulphuric acid, drop by drop, so as to avoid heating, agitate the mixture and set aside. It should rapidly separate into two equal layers, of which the upper one is but little colored, while the lower one is deep red. Should the oil contain little thymol, the mixture separates slowly, and the lower layer is mostly more than one-half, and instead of being red is merely pale yellow or reddish-yellow.—*Phar. Centralh.*, 1882, No. 27.

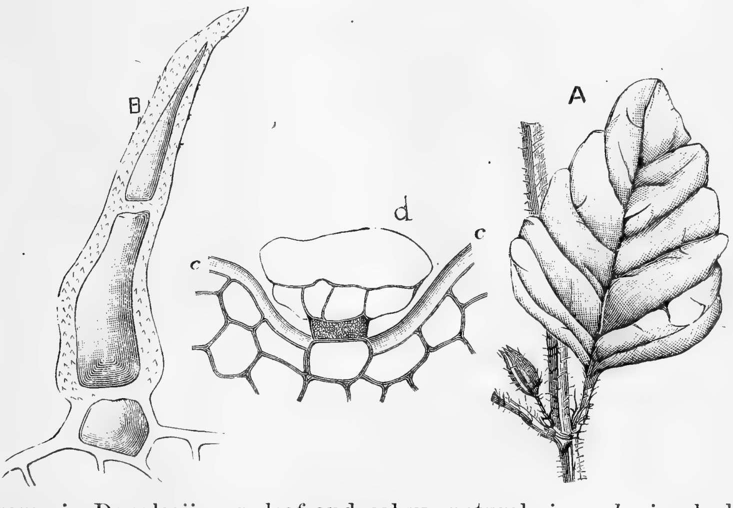
Monarda fistulosa, Lin.; Wild Bergamot.—The leaves have a prominent midrib and secondary nerves, the latter anastomosing near the



Monarda fistulosa, *Lin.* *a*, upper side of leaf, natural size. *b*, calyx, slightly magnified. *c*, epidermis from lower surface of leaf, magnified 160 ×.

margin, are apparently smooth, but under the magnifying glass are seen to be hairy and densely punctate upon both surfaces. Under the microscope numerous small conical one-celled hairs, about ·05 mm. long, are observed, occasionally with a somewhat longer several-celled hair; the hairs on the margin are 1 mm. long and many-celled; the glands are situated in depressions upon a broad stipe. The calyx is nearly 1 cm. long, tubular, many-ribbed, five-toothed, densely hairy on the margin, internally smooth, externally somewhat hairy and beset with yellow glands, which are visible under the magnifier. The mint-like odor becomes prominent on rubbing; the taste is pungently aromatic.—Dr. J. Moeller in *Ph. Centralhalle*, No. 29.

Micromeria Douglasii, Benth., known as *yerba buena*, a labiate plant of Northern California and Columbia, has been recommended as an anthelmintic, emmenagogue and febrifuge. The drug is described by Dr. J. Moeller as consisting of quadrangular hairy stems. The leaves are opposite, ovate, short-petiolate, obtuse, coarsely crenate, with the nerve branches running to the margin, and with sparse tertiary branches; the upper side almost smooth, the lower surface densely finely punctate, and on the nerves hairy; the largest leaves 4 cm. ($1\frac{3}{5}$ inch) long and 3 cm. ($1\frac{1}{5}$ inch) broad; the upper leaves smaller and more acute. The axillary pedicels are thin, about 7 mm. long; the calyx, mostly detached, is elliptic, 4 mm. long, 5 mm. broad, five-toothed, many-ribbed, hairy, internally naked, and contains at its base 4 nutlets. The drug has a slight aromatic odor, and an aromatic, somewhat bitter taste.



Micromeria Douglasii. *a*, leaf and calyx, natural size. *b*, simple hair, magnified 300 diam. *c*, cuticle, and *d*, gland, magnified 300 diam.

The cuticle on both surfaces of the leaves is firm. The hairs are firm, conical, mostly two-celled, and rest, with a broad base, upon the somewhat prominent parent cell. The glands are contained in concave depressions, are depressed, have a simple stipe cell, and contain a yellow secretion.—*Phar. Centralhalle*, 1882, No. 29.

Eugenia Cheken, Molina.—From Dr. J. Moeller's description of cheken leaves we take the following, supplementing that given on page 351 of this journal. The leaves are stiff, but not fragile, deli-

cately wrinkled, light green, occasionally yellowish, short-petiolate, somewhat revolute on the margin, pellucid-punctate, the venation observable on the lower surface, while on the upper surface only the midrib, and in the larger leaves also a few secondary nerves are seen; they are almost inodorous, but when rubbed are agreeably aromatic, and have an aromatic, afterwards strongly bitter taste.

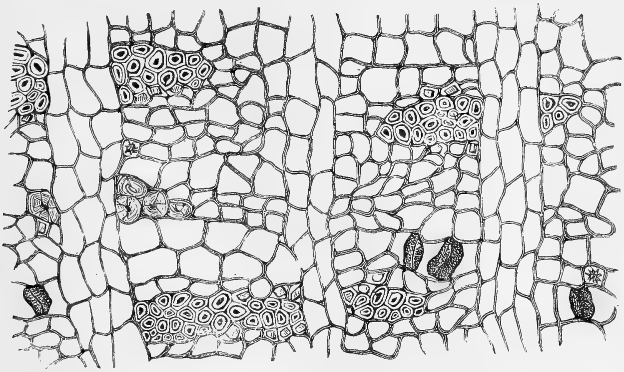
Cheken leaves, natural size. *a*, upper surface. *b*, lower surface.

The cuticle is particularly prominent upon the upper surface; the palisade cells form two rows, occupying scarcely one-third of the thickness of the leaf, and contain occasionally a group of crystals; the mesophyll consists of loose, irregularly branched parenchyma, and rarely contains crystals; the globular oil glands, with deep yellow contents, are scattered under the cuticle upon the upper and lower surface.

The virtues of cheken leaves reside in the tannin and volatile oil.—*Phar. Centraihalle*, 1882, No. 29.

The bark of Rhamnus purshiana has been examined microscopically by Dr. J. Moeller. The corky layer is about ·045 mm. thick, and consistst of 8 or 12 rows, somewhat flattened, rather thick-walled, but not sclerotic cells. The parenchyma of the primary bark is tangentially elongated, partly of a collenchymatic character, free from secondary cork, and contains scattered groups of roundish stone cells, with very thick walls, and accompanied by single rhombohedric crystals; the thin-walled parenchyma contains numerous groups of crystals. The inner bark consists of medullary rays composed of two or three rows of thin-walled, somewhat radially elongated cells, and of broader bast rays in which the parenchyma cells are coarsely dotted upon the radial and horizontal walls, and loosely united in a tangential direction; the sieve tubes are larger, irregularly angular, and united, to the number of 4 or 6, by means of coarsely porous sieve plates, and on the radial sides marked with roundish sieve fields; the bast fibres form alternate groups of two or three rows, extending into few bast rays, and are surrounded by crystal cells. The medullary parenchyma contains a crummy lemon-yellow substance, which dissolves in water with a yellow, and in cold potassa solution with a dingy red color. (See also "Am. Jour. Phar.," 1879, p. 165.)

Cascara sagrada is thicker and more fragile than frangula bark, and differs from the latter also in containing groups of stone cells in the primary bark, and a few such groups also in the bast layer.—*Phar. Centralhalle,* 1882, No. 28.



Rhamnus purshiana; transverse section through bast layer.

Testing of Jalap Tubers.—Hager states that the specific gravity of jalap resin is 1·15 to 1·16, and that of the sugar 1·5 to 1·6. Good jalap tubers, rich in these constituents, have a density of 1·15 to 1·18, and none should be accepted for medicinal use that have not at least the specific gravity 1·140, which is conveniently ascertained by means of a solution prepared from 200 grams dry table salt and 1,055 grams of water. At least 90 per cent. of the jalap tubers should sink in this liquid at a temperature of 15° to 17°C., care being taken to remove gas bubbles from the surface of those tubers which may float. The jalap is afterwards collected upon a sieve, rapidly washed with water and dried.—*Phar. Centralhalle,* 1882, No. 27.

Moravian Rhubarb.—The culture of Rheum compactum in Moravia was commenced, in the beginning of the present century, by Prikryl, apothecary in Austerlitz. Until about 25 or 30 years ago the root was largely exported to Lyons and Milano, where it was used for dyeing silk. With the use of chemicals for dyeing, the price of this rhubarb receded to about 10 florins per hundredweight, but more recently has advanced again, and is about 1 florin per pound for triennial roots. This rhubarb is again largely exported, chiefly to Russia, whence it is exported again as Asiatic rhubarb. Prof. Dr. A. Vogl has pointed out histological differences by which this article may be distinguished from Chinese rhubarb; but a correspondent insists

that even in this respect it will resemble the latter much more closely if permitted to remain in the ground for 5 or 6 years. The commercial article is said to yield extracts, tinctures and infusions which, not only in color, odor and taste, but likewise in activity, compare favorably with the corresponding preparations of Chinese rhubarb. The author urges the employment of this rhubarb, partly for patriotic reasons as far as Austria-Hungary is concerned, but chiefly on account of its low price and its good effects, these being fully secured if 5 parts of Moravian rhubarb be used in place of 4 parts of the Chinese root, as was pointed out already, in 1808, by Trommsdorff.—*Phar. Post*, June 16, 1882, p. 206—209.

NOTES ON ALUMEN, B. P.

By W. Watson Will.

Ammonio-aluminic sulphate manufacture seems to have become a thing of the past, and great difficulty is now experienced by pharmacists in obtaining it, the potassic salt having entirely taken its place. No doubt the consumption of alum from a pharmaceutical point of view is small in comparison to the enormous quantities used in the arts and manufactures of this country, but I think if there had been a persistent demand, however small, for ammonia alum, its manufacture would not have become obsolete. In a communication I had from Mr. R. King, of Glasgow, some time ago, he assured me there was no demand for ammonia alum, a statement fully endorsed by Mr. P. Spence, of Pendleton, in a note I had from him regarding this subject. Various have been the processes employed in the preparation of ammonia alum, some makers preparing the aluminum sulphate from aluminous schist or shale, others using clay or kaolin. The following is a brief *résumé* of one of the processes: Shale of coal measures, previously calcined, is placed in iron vessels lined with lead, and sulphuric acid from an adjoining receiver is poured over it; the mass then allowed to digest at a temperature of 240°F., this degree of temperature being sustained by a fire underneath the vessels and also by steam and ammonia vapor being blown into the pan. The solution, after evaporating for some time, is poured into large coolers and strongly agitated to prevent formation of large crystals. The deposit of fine crystals, commonly called "flour alum," is now washed and redissolved by steam, and the solution run off into large vessels, called "roaching

casks," to crystallize. After seven or ten days the staves of these "casks" are taken off, and a complete shape is left of crystallized alum. A few holes are made in the side of this mass, and the mother-liquors allowed to drain off; then it is broken and packed for sale. Other makers, instead of adding ammonia in a state of vapor, more generally used the chloride or sulphate made by neutralizing ammoniacal gas liquor with hydrochloric or sulphuric acid; the former of the two solutions was mostly used, on account of the amount of iron contained in the crude aluminum sulphate. Following the latter of the two processes just mentioned, I would suggest a short mode for the preparation of ammonio-aluminic sulphate, easy in manipulation, adaptable to small laboratories, and satisfactory in result. Take of aluminum sulphate (cake alum) 14 pounds, ammonium sulphate $3\frac{1}{2}$ pounds, warm water 4 gallons; dissolve the ammonium sulphate in half a gallon of water and the aluminum sulphate in the remainder, filter the solution to free it from the finely divided silica, and to the filtered liquid add the ammonia solution; then apply heat until the solution boils, pour off into a suitable vessel to crystallize. After a few days draw off the mother-liquor; then drain the crystals on a loosely stopped funnel. One hundred grains of ammonia aluminic sulphate made by this process, on being incinerated, left a residue which on cooling weighed 54 grains, corresponding to the requirements of the Pharmacopœia.—*Phar. Jour. and Trans.*, July 8, 1882.

PRACTICAL NOTES FROM VARIOUS SOURCES.

By the Editor.

Carbolic acid liniment, prepared by dissolving carbolic acid 1 part in olive oil 100 parts, is recommended for the cure of itch, for which purpose two applications are said to be sufficient.—*Zeits. f. Diagn.*, i, p. 80.

Preparation of Crystallized Hyoscyamine.—Duquesnel recommends the following process: Displace 2,000 parts of powdered hyoscyamus seed with boiling 90 per cent. alcohol, containing 1 part of tartaric acid; distil the tincture; decant the green oil, weighing about one-third of the seed, from the syrupy layer, and agitate the former with dilute sulphuric acid. The acid solution is nearly neutralized with potassium bicarbonate, filtered and evaporated in a water-bath. Cool the syrupy residue, exhaust it with alcohol which leaves potassium

sulphate undissolved, distil off the alcohol and evaporate it completely in a water-bath; dissolve in very little water, add potassium bicarbonate in slight excess, agitate with chloroform, filter this solution and treat it with dilute sulphuric acid slightly in excess; decolorize the solution of sulphate with purified animal charcoal, evaporate at a moderate heat to a syrupy consistence, mix with precipitated calcium carbonate, afterwards with fine sand, and dry the mixture over sulphuric acid or burned lime; exhaust the powder with chloroform, distil and finally evaporate spontaneously after the addition of a little rectified toluene.

Thus prepared, the alkaloid is in long prismatic needles, colorless, inodorous, soluble, with a strong alkaline reaction, in water, readily soluble in alcohol, ether and chloroform, and, like atropine, yields a violet color when heated with nitric acid and treating the dry residue with alcoholic solution of potassa. With sulphuric acid and potassium bichromate it evolves an agreeable odor somewhat resembling that of bitter almond. The sulphate is a neutral salt and little deliquescent.—*Jour. Phar. Chim.*, Feb., 1822, pp. 131—138.

SOME REMARKS UPON MODERN PHARMACEUTICAL STUDY.

By H. J. Möller.

(Continued from page 424).

Italy.

The following facts respecting pharmaceutical education in Italy I have obtained from Mr. Kernwein, "chimico-farmacista" in Florence, to which gentleman my friend Mr. Arthur Meyer (at present an assistant at the pharmaceutical institute in Strassburg) had the kindness to introduce me

The most recent law, regulating pharmaceutical study, is the royal decree of March 12, 1876. The course is arranged in a quite peculiar way which very much resembles the system employed in Spain and Greece.

There are two classes of pharmacists, viz.: "farmacista" and "laureato (or "dottore") in chimica e farmacia," and also assistants (called "ministro," "giovane" or "commesso"); these last do not correspond to the German "Gehülfen," but are always examined pharmacists, *i. e.*, have all passed the "Major."

The young man who wishes to commence the study of pharmacy, must first prove that he is qualified to enter the third class of the "liceo,"[1] or he

[1]The "liceo" is the classical school; the third class is the highest, and the final examination of this class is called the "licenza liceale," and thus corresponds to the German "Maturitätsprüfung," and the French "baccalauréat."

must have passed the three first classes in an "instituto tecnico;" (this school corresponds to the German "höhere Realschule;") in the last case he must pass a special examination in Latin.

If these demands are fulfilled, the young man does not begin his *practical* education, but commences immediately to follow the lectures at the universities, where, according to Article 2 of the above-mentioned law, special pharmaceutical schools are to be established. Such a "scuola di farmacia" already exists in Florence, where it is connected with the "scuola di medicina." The course occupies from four to five years, according to the two following plans.

A. Plan of study, requisite for the degree of "*farmacista.*"

First year: inorganic chemistry, botany, mineralogy, physics.—Second year: Organic chemistry, botany, pharmaceutical and toxicological chemistry, materia medica; practical exercises in pharmaceutical chemistry, toxicology and qualitative analysis.—Third year: Continuation and termination of the same studies and exercises as in the second year.

At the end of every year examinations are held in the completed branches. After the last of these examinations, the student goes to a pharmacy of a hospital, to a military or other pharmacy, which is authorized by the government to this end, and there first he commences his practical education which is finished in one year. This last, fourth year of study is called the "anno di pratica," and is terminated by a final examination, which includes qualitative analysis, a chemical and a "galenical" preparation, medical botany, materia medica, and the dispensing of prescriptions.

B. Plan of study requisite for the degree of "*dottore* (or "*laureato*") *in chimica e farmacia.*" The studies extend over five years, and are divided into two periods.

1. The first period (three years): Inorganic and organic chemistry, physics, pharmaceutical and toxicological chemistry, botany, mineralogy, geology, zoology, materia medica and toxicology.—Practical exercises in: Physics, botany, mineralogy, materia medica, qualitative analysis and chemical preparations.

2. The second period (two years): In the fourth year the candidate studies more especially qualitative, toxicological and zoochemical analyses; he must also make some separate studies in a special branch of natural science, chosen by himself. In the fifth year ("anno di pratica") he learns practical pharmacy as above-mentioned. Now he passes the final examination which consists of three parts; the first includes qualitative, quantitative and toxicological analyses and an oral examination in these branches; the second part embraces two chemico-pharmaceutical preparations, medical botany and materia medica; the third consists of a dissertation on a theme, chosen by the candidate himself, and a discussion of this dissertation. It is required of the candidate, who wishes to be a "dottore" in pharmacy that he shall have passed the above-mentioned "licenza liceale."

Greece.

The pharmaceutical course in Greece resembles that of Italy in many respects. The following communications I have obtained through a correspondence with Professor Xavier Landerer of Athens, who formerly was

pharmacist to the king, and from 1835 to 1868 was a teacher of the Greek pharmaceutical students.

In the year 1837 the university in Athens and the pharmaceutical school therewith connected were established, and from 1837 to 1868 it was required that the student should have reached the third class[1] of the classical school. Then he was two years in a pharmacy as an apprentice and afterwards he studied at the university for two years more, following the lectures at the pharmaceutical school in chemistry, pharmacy, materia medica, toxicology, botany and physics. After this he served as an assistant for at least a year, and then passed a final and practical examination.

These rules were changed in the year 1868. The above-mentioned "absolutorial" examination is now required before entrance upon the study of pharmacy, and the student commences immediately to follow the lectures at the university, without any foregoing practical education. Having studied for three years at the university, he spends a year in a pharmacy and then passes the "Major." This is quite the same as that demanded of the Italian "farmacista," and I will, therefore, not tire the reader with a repetition of the whole plan of study, but will refer him to the plan A, given in my remarks on Italy.

Professor X. Landerer, who is himself a German, says in one of his letters to me that he considers the present standard of Greek pharmaceutical examinations to be quite as high as that of the corresponding ones in Germany.

Belgium.

The pharmacy of this country has, as so many other things in Belgium a French form. On a journey in the spring of 1880, I had opportunity to notice this myself, and to collect a part of the following notes which I have made more complete through a correspondence with Professor A. Herlant, teacher in materia medica at the pharmaceutical institute in Brussels.

In Belgium pharmaceutical study is made at four special pharmaceutical institutes, which are connected with the four Belgian universities in Brussels, Ghent, Louvain and Liège.

According to the "règlement organique pour la collation des grades académiques de l'université libre de Bruxelles," which I obtained at the questorship of the University of Brussels, the requirements at the pharmaceutical examinations are fixed by Articles 16 and 17 of the law of May 20, 1876, as follows:

A. The "candidature[2] en pharmacie" requires only an examination, which embraces the elements of physics, general chemistry, general and medical botany, mineralogy and geology, and also a practical test in chemistry.

B. The degree of "pharmacien" (*i. e.*, the "Major") requires also one examination, but this may be divided in two successive parts if the candi-

[1]The third class is the highest, but the final examination of this class (the so-called "absolutorial" examination) was not formerly demanded. This "absolutorial" examination corresponds thus to the German "Maturitätsprüfung," and the French "baccalauréat."

[2]This degree gives the possessor the right to be an assistant only, and thus corresponds to the German "Gehülfe."

date prefers. The first part embraces the elements of analytical and toxicological chemistry, drugs, posology and theoretical and practical pharmacy. The second part includes: (1) Two chemical preparations; (2) Two "galenical" preparations; (3) A qualitative analysis; (4) A toxicological research (under this also quantitative analysis); (5) An analysis of a remedy and the determination of possible adulteration (by means of chemical and microscopical research); (6) An especial microscopical analysis (of a mixture of different sorts of flour, powder, etc., or of the micrographic characters of a drug.

After the apprenticeship in a pharmacy the young man studies two years at the pharmaceutical institutes before he passes the examination for the "candidature en pharmacie," and then two years more before the examination for the title of "pharmacien." In the first two years the students are matriculated at the "faculté des sciences," in the last two years at the "faculté de médicine." The pharmaceutical study at the university thus lasts in all four years; in the last two years the students are instructed in applied micrography. When the diploma as "pharmacien" is obtained, the successful candidate may establish himself when and where he will. By this short communication one can see that pharmaceutical study in Belgium is very well arranged.

France.

My notes on the study of pharmacy in France I have myself collected from different journals, programmes, collections of laws, in the Bibliothèque Nationale here in Paris. I am highly indebted to Professor Planchon for the kindness with which he has given me all further information that I desired.

France is the country possessing the largest number of special schools of pharmacy, and pharmaceutical study is here so highly developed that, so far as I can see, only Germany can compete with it.

The most famous school of pharmacy in France is the Ecole supérieure de pharmacie de Paris. The present school is situated in the Rue de l'Arbalète, in the old Quartier Latin, and was founded as early as the sixteenth century by the pharmacist Nicolaus Houël, but was at first a very unimportant institution. In 1777 the school was much improved and obtained fixed professors. At length Napoleon Bonaparte issued the law of Germinal 21, of the year XI (*i. e.*, April, 11, 1803), which ordered the establishment of three large écoles supérieures de pharmacie in Paris, Strassburg,[1] and Montpellier. Later, Louis Phillippe issued an "Ordinance du Roi du Septembre 27, 1840," which connected the pharmaceutical schools with the universities, and gave them the same rights as the other departments of the universities (for example: Ecole de médecine, Ecole de droit, etc.).

The above-mentioned "Ecole supérieure de pharmacie de Paris," in the Rue de l'Arbaléte, is no longer sufficient for the present requirements of

[1]After the war 1870--71, this school was transferred to Nancy. The old French pharmaceutical school in Strassburg is the same which now, under the direction of Professor Flückiger, has the title: "Das pharmaceutische Institut der Universität za Strassburg."

the science and for the great number of students.[1] A fine new building has therefore been erected on ground which formerly was a part of the Jardin du Luxembourg. This new school, on the corner of the Avenue de l'Observatoire and Rue Michelet, is by far the largest pharmaceutical institute in the world, and will cost between four and five millions of francs. The two amphitheatres, where the lectures are to be held, can each contain five hundred auditors, and the large building, where the laboratories are collected in three stories, is about 250 paces long; all the other parts of the school being in proportion to these rooms, it is easy to get an idea of the large scale on which this school is built. A small part of the new school is already used, but the whole institute will not be finished before the spring 1881.

Besides these three "Ecoles supérieures de pharmacie" in Paris, Montpellier and Nancy, France has also three so-called "Facultés mixtes de médecine et de pharmacie" in Lille, Lyons and Bordeaux. These six schools are higher than the preparatory pharmaceutical schools ("les écoles préparatoires de médecine et de pharmacie"), which are again divided into "Ecoles de plein exercice de médecine et de pharmacie" (in Marseille and Nantes) and "Ecoles préparatoires secondaires." At the present time one of the last-mentioned schools is found in each of the following sixteen cities: Alger, Amiens, Angers, Arras, Besançon, Caen, Clermont, Dijon, Grenoble, Limoges, Poitiers, Reims, Rennes, Rouen, Toulouse and Tours.

There are two classes of pharmacists in France, but according to a decree of August 31, 1878, there is no other difference between the education of "les pharmaciens de première classe" and "les pharmaciens de seconde classe," than that the first must be "bacheliers," *i. e.*, have passed the whole classical school, while the second need only to have passed "la classe de quatriéme."[2] There is in addition a higher diploma for the pharmacists of the first class. This diploma is called "le diplôme supérieur de pharmacien de première classe," and gives the right to compete for the professorships in the pharmaceutical sciences at the "Facultés mixtes de médecine et de pharmacie."

According to the "décret[3] du 12 Juillet, 1878, relatif aux conditions à remplir pour obtenir le diplôme de pharmacien de première classe," which, as above mentioned, is now also applicable to the pharmacists of the second

[1]There are now nearly six hundred pharmaceutical students at the Paris school.

[2]According to the "décret" and the "arrête" of June 19, 1880, and the "arrête" of August 2, 1880, the French classical schools ["les lycées"] consist of the following classes:—

Division élémentaire: (1) Classe préparatoire; (2) Classe de huitième [the lowest age of the scholar is nine years]; (3) Classe de septième [ten years].

Division de grammaire: (4) Classe de sixième [eleven years. Here the pupil commences to learn Latin, ten hours a week]; (5) Classe de cinquième [twelve years; ten hours of Latin a week; (6) Classe de *quatrième* [thirteen years; six hours of Latin and six hours of Greek a week. It is the final examination of this class which is demanded in order to be a pharmacist of the second class].

Division superieure: (7) Classe de troisième [fourteen years]; (8) Classe de seconde [fifteen years]; (9) Classe de rhétorique, Classe de philosophie [sixteen years].

It is the final examination of this last class which is demanded in order to be a pharmacist of the first class, and it gives the right to the titles of respectively "bachelier ès lettres" or "bachelier ès sciences."

[3]As published in Journal Officiel, July 20, 1878.

class, the candidate must prove that he has passed the required examinations in the classical school. Then he must stay three years in a pharmacy before he passes his first pharmaceutical examination ("un examen de validation de stage"), which corresponds to the German "Gehülfenprüfung." This examination is ordered by a decree[1] of December 30, 1878, and is held at the pharmaceutical schools by a professor and two pharmacists of the first class; it embraces (1) a "galenical" or chemical preparation according to the pharmacopœia; (2) the preparation of a remedy after a prescription; (3) the determination of ten compound remedies and of thirty plants or parts of plants, belonging to the materia medica, and (4) the answering of questions upon different pharmaceutical operations.

Now the student leaves the pharmacy and spends three years in a school of pharmacy; if he intends to be a pharmacist of the first-class, he is obliged to pursue his studies at one of the six higher pharmaceutical schools. At the end of each year he passes an examination; the first includes: physics, chemistry, toxicology, and pharmacy; the second embraces: botany, zoology, materia medica, hydrology, and mineralogy; the third consists of pharmaceutical and chemical preparations. At the first examination the candidate must make a chemical analysis, and at the second a microscopical preparation. At the third examination he is given four days to make the required preparations under the survey of a professor; the oral test at this last examination is held in two sittings.

"Le diplôme supérieur de pharmacien de première classe" can be given to the pharmacists of the first class after the defence of a thesis and some new and very severe examinations.

Pharmaceutical study in France, at least in the six higher schools and especially in the Parisian school, must be regarded as having attained as high a state of development as any in Europe. I shall not here tire the reader with a complete review of these studies, but only refer to the programmes[2] of the respective schools.

Here I shall end these short remarks on the present state of pharmaceutical study. It is not for me to make the application of these notes to English pharmacy, since I know too little of its needs. My desire has been only to give a short report of what I have seen and learned of the important educational foundation of our profession. I could have wished to make these communications at least as complete as in the original Danish edition, but a journal is not the right place for such more comprehensive researches, and therefore, I must beg my colleagues to receive my notes as they now lie before them, and I shall be very happy if, in this abbreviated form, their interest have been preserved.

[1]Journal Officiel, January 7, 1879.

[2]For example: "Programmes des cours de l'Ecole supéreuree de pharmacie de Paris, premier et second semestre." "Programmes des cours complementaires de la même école." The publisher is Dunod, Quai des Augustins, No. 49, Paris. The price is one franc and fifty centimes for all the three programmes.

VARIETIES.

Borax in California.—Borax is now well known to occur in very many of the salt-springs in the Coast Mountains of California. But in only two places has it been found in large quantities: these are Borax Lake and Hachinhama (pronounced *Hah'-chin-ha'-ma*), both being in the immediate vicinity of Clear Lake, about eighty miles north of San Francisco.

Borax Lake is a shallow pool intensely of alkaline water, without inlet or outlet, and of course its extent depends on its reception of rain water. After an exceptionally wet season it has a length of perhaps a mile and a half, with a depth of eight to ten feet; after an exceptionally dry season, on the contrary, it shows sometimes no water, the muddy bottom being covered with saline incrustations. When it has a length of three-fourths of a mile, with a depth of four feet, being perhaps its average condition, the water holds in solution 18·75 grains of solid matter to the ounce—·039 of its own weight. This consists of salts of soda, in the following proportions: Sodium carbonate, ·618; sodium chloride, ·204; sodium biborate, ·178.

But this alkaline water, exceedingly rich as it is in borax, constitutes only a trifling part of the commercial value of the lake. In fact, it has never been turned to accaunt at all in the manufacture of borax, though such use of it is entirely practicable, as the statements to be presently made in relation to Hachinhama will show. The muddy bottom of the lake was found, immediately on its discovery in 1856, to contain borax in crystals, in quantities most astonishing.

These crystals, being tested by various workers in iron and steel, were pronounced equal to the very best of refined borax. They are, in fact, pure biborate of soda, without any other impurities than the mud mechanically entangled with them in their process of crystallization. They correspond to the native borax of other localities, designated as *tincal*, but yet are decidedly distinct from it. In fact, no such crystals as those of Borax Lake have ever been found in any other locality, and there are several points in connection with their mode of formation, and even their very existence, which are by no means easy of comprehension.—Dr. W. O. Ayres, in *Popular Science Monthly* for July.

Use of Geum Album.—Dr. W. A. Spurgeon, in "Therapeutic Gazette," March, 1882, says that this plant, is already useful as an anti-emetic; that it relieves gastric irritation (from any cause) and headache. A teaspoonful of a tincture, representing eight troyounces to the pint, is a dose, but larger doses may be given.— *Virginia Medical Monthly*, August, 1882.

Agaricus is much used in France as a remedy for nightsweats, and Dr. R. V. Wolfenden has found it of great value. It is given in doses of twenty grains, prescribed in a confection. It may at times cause diarrhœa which is easily prevented by combining it with a little opium.—*Medical Times and Gazette.*

NITRO-GLYCERIN has lately been experimented with in doses of $\frac{1}{100}$ to $\frac{1}{50}$ of a grain and endorsed by Dr. Wm. Murrell of the Royal Hospital for Diseases of the Chest, London. He has found it useful in affording relief in angina pectoris, as well as in neuralgias in other portions of the body. Dr. Murrell began its use in doses of 1 drop of a 3 per cent. solution every four hours, gradually increasing until the patient had taken as much as 8 drops every four hours. The drug is now prepared in the form of sugar and gelatin coated pills, containing the one-hundredth of a grain each; of these one or two may be taken as occasion may require.—Dr. A. Atkinson, *Transactions Maryland Medical Society.*

THE EFFECTS OF OIL OF TANSY.—Dr. G. Jewett ("Boston Med. and Surg. Jour.") reports eight cases of poisoning with this drug. Case 1: Fifteen drops at 11 A.M., teaspoonful at 2 P.M.: convulsions, shock, general cyanosis; recovery. Case 2: Teaspoonful to promote catamenia: convulsions and death in one hour and a half. Case 3: Unknown quantity to cause abortion: convulsions; death in three hours and a quarter; no abortion. Case 4: Teaspoonful to cause abortion; coma, recovery; no abortion. Case 5: Four drams; spasms and death. Case 6: To cause abortion; rapid death; no abortion. Case 7: Decoction of tansy-leaves to produce abortion; paralysis; coma; death in twenty-four hours without abortion. Case 8: Infusion of leaves daily for a week; also for vaginal injection; abortion, metritis, peritonitis; recovery after three months. As druggists are often asked for oil of tansy under various pretenses we believe the above table will be useful in reminding them of the dangers attending the sale of tansy and its preparations.—*Louisville Med. News.*

HYPODERMIC INJECTIONS OF CAFFEINE.—The "Lancet" says that owing to its very slight solubility in water, caffeine has not hitherto been used hypodermically. M. Tanret has discovered that caffeine dissolves readily in solutions of benzoate, cinnamate and salicylate of soda, the double salts being thus formed. Salicylic acid yields the salt most soluble in water. M. Dujardin-Beaumetz has employed these solutions hypodermically, and has ascertained that they do not irritate. Solutions for administration by the mouth may also be readily obtained in this manner. *Med. and Surg. Rep.*, August, 12.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

THE IOWA COLLEGE OF PHARMACY is a new institution, located at Des Moines, and commencing its first course of lectures October 10th. The faculty consists of T. E. Pope, A. M., Professor of Chemistry; W. W. Hale, LL.B., M. D., Professor of Materia Medica and Toxicology; Emil L. Boerner, Ph. G., Professor of Pharmacy; and Robert McNutt, A. M., M. D., Professor of Botany. The aim of the institution, according to the "Announcement" before us, is that "the incorporators of this school, having long recognized the need of such an institution in this section, have deter-

mined to establish such an one in Des Moines as will enable graduates to meet these requirements" (*i. e.*, of the Iowa Pharmacy Law).

THE WISCONSIN PHARMACEUTICAL ASSOCIATION held its third annual meeting at Oshkosh, August 8th to 10th, President F. Robinson in the chair; E. B. Heimstreet, Secretary. Reports were received from the President, Permanent Secretary, Executive Committee, Committee on Drug Market and the Board of Pharmacy, the latter stating the total registrations under the new pharmacy law to be 1,088, of which number 902 are registered pharmacists, 6 minor and 180 assistant pharmacists; 46 were graduates and 31 licentiates; 30 applicants were rejected. Professor J. M. Maisch, of Philadelphia, and Dr. C. Smith, of Evansville, were elected honorary members.

A paper on Powdered Drugs, by E. B. Stuart, was read, and ordered to be published, and greetings were exchanged by telegraph with the North Carolina Pharmaceutical Association, in session at Winston. Resolutions were passed favoring the organization of a school of pharmacy in connection with the State University, and in opposition to the use and sale of all secret medicines, such as proprietary and trade-mark compounds.

The officers elected for the current year are, President, George Bauman, of Oshkosh. Vice-Presidents—R. D. Pulford, of Mineral Point; T. J. Hooper, of Platteville. Secretary, E. B. Heimstreet, of Janesville. Local Secretary, T. H. Spence, of La Crosse. Treasurer, W. P. Clarke, of Milton. After the appointment of the Standing and Special Committes the Association ajourned, to meet again at La Crosse on the second Tuesday of August, 1883.

EDITORIAL DEPARTMENT.

CHARGES AGAINST PHARMACISTS.—The dearth of news incidental to the dog-days has caused the "Philadelphia Press," a daily newspaper, to enliven its columns with onslaughts upon the integrity of the pharmacists of this city, and to attract attention thereto by sensational headings, such as "Tricky Druggists," "The substitution of a cheap article for a more expensive one a common practice with some apothecaries," "Common Adulterations by some Apothecaries," and others of a similar nature. These will explain the compass of the charges brought forward, namely, adulteration and substitution. As might have been expected, certain physicians rushed into print, regardless of the consequences; several who had figured in similar crusades in previous years were tempted to a renewal of hostilities; others, more or less obscure, embraced the opportunity of being publicly styled "prominent." The few really prominent physicians who responded to the interviewing reporter had experienced no difficulty in procuring drugs of good quality, and in having their prescriptions accurately compounded. The charges, as heretofore, were based on failure in the expected activity, on low price, on incorrect color, and in one case the microscope was guilty of revealing to an M.D. that his sugar-coated 2-grain quinine pills contained only one-quarter of a grain of this valuable antimalarial agent.

We should not have taken any notice whatever of this attack if the charges had not found their way into many periodicals published in various parts of the country. To the intelligent physician and pharmacist they need no refutation, since they bear the stamp of absurdity. Our readers are aware that this journal has always denounced corrupt practices in the preparation and dispensing of medicines; but during a long service in the pharmaceutical ranks we have found integrity and conscientousness to be the rule, and want of probity to be the exception, the same as in other professions and trades. The abortionist is a despicable individual, but his vile practices do not cast a stain upon the escutcheon of medicine. In an identical relation towards pharmacy is he who adulterates and substitutes as charged above. The Trade Association of Philadelphia Druggists has taken a sound position in this matter: a committee appointed by it has asked for the proofs of the charges made, and offered to prosecute, under the adulteration clause of the Philadelphia Pharmacy law, any one against whom such proof may be furnished. As far as we are aware, neither names nor evidences have been forthcoming.

At a later stage of these tirades against pharmacists, the "Press" has seen fit to pour oil upon the troubled waters, and to prepare the following healing balm for the wounded:

> The revelations do not strike at the whole retail drug trade. The swindlers are in a small minority, but there are enough of them to make it worth while to lay their practices bare. And happily there are so many druggists of established reputation and unquestioned integrity that the customer may have a wide range of choice and still be within the bounds of safety.

A Western paper, commenting on the above charges, very properly states that there is no safeguard against such alleged defraudations except the integrity of the apothecary.

Chemical Nomenclature.—It is unnecessary for us to point out the advantages which would result if a uniform nomenclature would be adopted by writers on chemical subjects. The Pharmacopœia of 1870 had made a few changes, which have in most cases met with general approval. Several additional changes will be found in the new Pharmacopœia now in course of publication, and will doubtless lead towards greater uniformity in the nomenclature of pharmaceutical literature. Improvements in this respect might, perhaps, have been pushed still farther; at any rate we think that our readers will recognize in the following plan a comprehensive effort at systematizing the nomenclature of chemical compounds. This plan was elaborated by the British Chemical Society in 1879, and was recently republished, with several slight modifications, with the view of promoting uniformity of nomenclature and notation in papers communicated to the Society. We omit the instructions relating to the notation, which refer mainly to graphic formulas.

1. Employ names such as *sodium chloride, potassium sulphate, ethyl acetate*, and use the terminals *ous* and *ic* only in distinguishing compounds of different orders derived from the same elementary radicles, *e. g.*, mercurous and mercuric chloride, sulphurous and sulphuric acid.

2. Term compounds of metallic and alcoholic radicles with (OH), *hydroxides* and not hydrates, *e. g.*, potassium hydroxide, phenyl hydroxide, the name hydrate being

reserved for compounds supposed to contain water of combination or crystallization. Compounds such as CH_3ONa, C_2H_5ONa, $C_7H_{15}ONa$, etc., should be termed sodium methoxide, ethoxide, heptyoxide, etc.

3. Apply the term *acid* only to compounds of hydrogen with negative radicles, such as HNO_3, H_2SO_4, H_3PO_4, and denote the oxides which form acids by names such as sulphuric anhydride or sulphur trioxide. Term salts containing an amount of metal equivalent to the displaceable hydrogen of the acid, *normal* and not neutral salts, and assign names such as hydrogen-sodium sulphate, hydrogen-disodium phosphate, etc., to the acid salts. Basic salts are as a rule best designated merely by their *formulæ*.

4. Use names such as *methane*, *ethane*, etc., for the normal paraffins or hydrocarbons of the C_nH_{2n+2} series of the form $CH_3.(CH_2)_5.CH_3$. The isomeric hydrocarbons are usually most conveniently represented by names indicating their relation to methane; for example, $CH_3.CH_2.CH_2.CH_3$ = propylmethane; $CH_3CH(CH_3)_2$ = isopropylmethane; or, although less frequently, by names such as diisopropyl.

5. Term the hydrocarbons C_2H_4 and C_2H_2 *ethylene* and *acetylene* respectively (not ethene and ethine. Distinguish the homologues of ethylene, whenever possible, by names indicating their relation to it, such as methylethylene, dimethylethylene, etc., denoting the di-derivatives of the form $C_nH_{2n+1}.HC:CH.C_nH_{2n+2}$ as α-, and those of the form $CH_2:C(C_nH_{2n+1})_2$ as β- compounds; thus, $CH_3.CH:CH.CH_3$ = α-dimethylethylene; $CH_2.:C(CH_3)_2$ = β-dimethylethylene. Similarly, use names such as methylacetylene and dimethylacetylene for the homologues of acetylene of the form $CH : C.C_nH_{2n+1}$ and $C_nH_{2n+1}.C : C.C_nH_{2n+1}$. Adopt the name *allene* for the hydrocarbon $CH_2 : C : CH_2$, and indicate the relation which its homologues bear to it in the same manner as pointed out for acetylene.

6. Distinguish all alcohols, *i. e.*, hydroxyl-derivatives of hydrocarbons, by names ending in *ol*, *e. g.*, quinol, catechol, resorcinol, saligenol, glycerol, erythrol, mannitol, instead of hydroquinone, pyrocatechin, resorcin, saligenin, glycerin, erythrite, mannite. Compounds which are not alcohols, but which are at present distinguished by names ending in *ol*, may be represented by names ending in *ole*, if a systematic name cannot be given. For example, write indole instead of indol; furfuraldehyde instead of furfurol; fucusaldehyde instead of fucusol. Ethers derived from phenols, such as $C_6H_5.OCH_3$, etc., hitherto called anisol, anethol, etc., may be distinguished by names ending in *oïl*, as anisoïl and anethoïl.

Alcohols should be spoken of as mono-, di-, tri-, or n-*hydric*, according to the number of OH groups.

7. Bodies such as the acids of the lactic series containing the group (OH) should be termed *hydroxy-*, and not oxy-derivatives, *e. g.*, hydroxyacetic and not oxyacetic acid. Compounds containing the analogous groups C_2H_5O, C_6H_5O, $CH_3.COO$, etc., should in like manner be termed ethoxy-, phenoxy-, acetoxy- derivatives. Thus ethoxypropionic acid instead of ethyllactic acid; 3 : 4 diethoxybenzoic acid instead of diethylprotocatechuic acid; and acetoxypropionic acid instead of acetyllactic acid. Terms such as diethylprotocatechuic acid should be understood to mean a compound formed by the displacement of hydrogen-atoms in the hydrocarbon radicle of protocatechuic acid by ethyl, viz., $C_6H(C_2H_5)_2(OH)_2.COOH$, and not $C_6H_3(OC_2H_5)_2.COOH$, just as dibromoprotocatechuic acid is understood to be the name of a compound of the formula $C_6HBr_2(OH)_2.COOH$.

8. The term *ether* should be restricted to the oxides of hydrocarbon radicles, and the so-called compound ethers should be represented by names similar to those given to the analogously constituted metallic salts.

9. Compounds of the radicle SO_3H should, whenever possible, be termed *sulphonic* acids, or, failing this, *sulpho-compounds:* as benzenesulphonic acid, sulphobenzoic acid, and not sulfi-compounds. Compounds of the radicle $SO_2.NH_2$, should be termed sulphonamides.

10. Basic substances should invariably be indicated by names ending in *ine*, as aniline, instead of anilin, the termination *in* being restricted to certain neutral compounds, viz., glycerides, glucosides, bitter principles and proteids, *e. g.*, palmitin, amygdalin, albumin. The compounds of basic substances with hydrogen chloride, bromide or iodide, should always receive names ending in *ide* and not *ate*, as morphine hydrochloride and not morphine hydrochlorate,

REVIEWS AND BIBLIOGRAHHICAL NOTICES.

A Pamphlet on the relation to each other of Education and Examination, especially with regard to Pharmacy in Great Britain. By Professor Attfield, F.R.S., etc. London, 1882. 8vo, pp. 97.

The education of the pharmacist should be two-fold: *technical*, which is acquired in the store and laboratory, from the handling of and manipulation with the numerous medicinal articles, and *general* or *scientific*, such as is obtained through systematic study, theoretical as well as practical. There is no "short cut" to the acquisition of knowledge; the student must learn to see and to investigate, mentally as well as practically, and to acquire this habit and turn it to useful account requires methodical training of the mind, which alone can afford the requisite clearness of perception and soundness of judgment. When these have been reached the student will be able to help himself along and he will not rest satisfied with what he reads and hears, but by proper inquiry will convince himself of the correctness of statements, and in this manner will become master of the subject.

Examinations are intended to test the soundness and extent of the knowledge of the candidate, and, judiciously conducted, will succeed in this purpose to a certain extent. But they should be regarded merely as a rough test of attainment; for at the very threshold of this test we are met with the system of "preparing for examination," which unfortunately prevails to a very large extent in the elementary schools, and is more or less unconsciously carried into collegiate and academical institutions. The temporary "cramming" of the students' mind with facts may and often does succeed in carrying him safely through the examinations, and may be, ahead of his competitors, where competitive examinations exist; yet the knowledge upon which the result has been attained is only delusive, because transient, and sooner or later forgotten, while that acquired by the patient student lasts and accumulates, even though the retentive powers of his memory be less brilliant.

Such teaching which merely aims to fit the student for passing the ordeal before the examiners is what Professor Attfield very aptly terms adapting the system of education to the system of examination. He shows the unsoundness of such an adaptation, and that thereby neither the public nor the students derive any lasting benefit. To attain this latter end he earnestly pleads for the reversed condition, the adaptation of examination to education, that is to say, to make the former dependent upon the latter; and in this view we heartily concur.

We cannot close this brief review of Professor Attfield's excellent pamphlet, in which American pharmacits will find much that is of valuable application for the present and more particularly for the future,—without quoting a sentence or two from tho author's remarks on certain points raised by his correspondents:

"A principle which should be commonly accepted is that while technical and general education and examination should be carried on by different men or different bodies of men, both the men or bodies of men should

be under the direction and control of the followers of the calling—in this case pharmacists, who indeed are alone qualified to direct and control matters pharmaceutical. Let pharmacists lose control over what is now defined as general phormaceutical education, and where is the guarantee that it will not be superseded by superficial and ephemeral instruction? Let them lose control over pharmaceutical examination, and where is the guarantee that it will be fitted to the requirements of pharmacy?"

Handwörterbuch der Pharmacognosie des Pflanzenreichs. Von Professor Dr. G. C. Wittstein. Breslau: Eduard Trewendt. 1882. 2. Lieferung.

Dictionary of Pharmacognosy of the Vegetable Kingdom. Part 2.

Die Naturgeschichte des Cajus Plinius Secundus. Von Professor Dr. J. C. Wittstein. Leipzig: Gressner & Schramm. 11. Lieferung.

Plinius' Natural History. Part 11.

Both works have been fully noticed before. The first one has reached the article "Gundelrebe" (Glechoma hederacea, *Lin.*); the latter to book xxvii. The value of both becomes even more apparent as the publication progresses.

Proceedings of the Connecticut Pharmaceutical Association at the Sixth Annual Meeting, held in Bridgeport, February 7th and 8th, 1882. 8vo, p. 87.

Proceedings of the Convention of Druggists, also of the Massachusetts Pharmaceutical Association. First Annual Meeting, Worcester, May 17, 1882. 8vo, pp. 80.

Proceedings of the Preliminary and First Annual Meetings of the Virginia State Pharmaceutical Association, held in Petersburg, January 4, and 5; and Richmond May 16, and 17, 1882. 8vo, pp. 39.

Proceedings of the Third Annual Meeting of the Kansas Pharmaceutical Association, held in Topeka, June 8, 1882. 8vo, pp. 14.

Accounts of these meetings will be found in this volume, pages 91, 139, 328 and 332.

Eleventh Annual Report of the Alumni Association of the College of Pharmacy of the City of New York. 1882. 8vo, pp. 62.

The pamphlet contains minutes of the meetings, several papers read, commencement exercises, etc.

American Medicinal Plants; an illustrated and descriptive guide to the American plants used as homœopathic remedies; their history, preparation, chemistry and physiological effects. By Charles J. Millspaugh, M. D. New York and Philadelphia: Boericke & Tafel. 4to. Part 1. Price $1 per number.

An illustrated work on American medicinal plants will be a welcome addition to our literature, because it is needed. The work under consideration will not contain all the American plants to which medicinal properties are ascribed, but only those which are recognized in homœopathic practice; yet their number will be about 180 or more, and the work will therefore contain many plants in addition to those recognized in the United States Pharmacopœia. Is is contemplated to publish the work by subscription in about thirty numbers, each of which, we suppose, to contain six plates.

That number of plates is at least contained in the first part now before us, namely, Sanguinaria canadensis, Inula Helenium, Apocynum androsæmifolium, Asclepias Cornuti, Symplocarpos fœtidus, and Iris versicolor.

The illustrations are made from original colored drawings made by the author from the living plants, and must be pronounced as handsome and acceptable, so that the plants themselves may be readily recognized by them, although the colors are in most cases rather too bright, and certain morphological characteristics are not properly indicated; for instance, the ray florets of Inula should be three-toothed instead of tapering to an acute point, the corolla lobes of dogsbane should be more revolute, and the follicles of the milkweed should be marked with spinous projections, and less tapering.

The botanical descriptions are, in our opinion, far too brief for a work of this kind, and do not in the least compare, for instance, with the detailed characters as given in Bentley and Trimen's work; in fact, the descriptions are essentially those given by Gray, in some cases still more abridged.

The pharmacognostical and chemical descriptions are in most cases quite familiar to us, though we recognize no resemblance in the mode of wrinkling of the rootlets of skunk cabbage and the roots of ipecacuanha, nor can we believe that the rhizomes of Iris versicolor and Calamus can be confounded except in name, they being popularly known as blue flag and sweet flag. Rhœadine (not rhœdinia) was never known as porphyroxin; but Merck's principle of the latter name was a mixture which owed its color reaction with acids to Hesse's rhœadine. Inulin is not a bitter principle, but has an insipid taste.

The physiological properties of the plants are very briefly given, but perhaps sufficiently stated for the scope of the work. In fact, we regard its scope as botanical rather than pharmacognostical or medical, and as such it deserves success. The morphological inaccuracies of the drawings can readily be obviated in the succeeding plates, and the value of the work for botanical purposes be increased by giving full descriptions of the plants in the place of brief diagnostic characters. The letter-press is quite commendable.

Catalogue of the Materia Medica, Pharmaceutical Preparations, Patent and Proprietary Medicines, with the uniform prices of the Orleans Pharmaceutical Association. August 1, 1882. New Orleans: L. Graham and Son. 8vo, pp. 88.

A neat pamphlet, printed on writing paper, ruled in columns for noting prices. It is, we believe, the first practical result of the organization of the society and aims at "promoting friendly feelings, and banishing unworthy jealousies." Establishing uniformity in the retail prices of the above classes of medicines is a desirable end which should be worked for in all localities where the unwise and unbecoming practice of "cutting" is observed. It evinces a laudable spirit when the committee states: "We feel that we have been just to ourselves, and then generous to our customers."

Mental Pathology and Therapeutics. By W. Griesinger, M.D., Professor of Clinical Medicine and of Mental Science in the University of Berlin, etc. Translated from the German (second edition), by C. Lockhart Robertson, M.D. Cantab., and James Rutherford, M.D. Edinb. New York: Wm. Wood & Co. 1882. 8vo, pp. 375.

The work is divided into 5 parts or books, treating of general considerations, the origin, forms, pathological anatomy, prognosis and treatment of mental disease. The author is one of the leaders of the German school of medical psychology. In this translation, which was made in 1867, it has been the endeavor to give the English reader an accurate and literal rendering of the German text.

A Treatise on the Physiological and Therapeutical Action of the Sulphate of Quinine. By Otis Frederick Manson, M.D., Professor of Physiology and Pathology in the Medical College of Virginia. Philadelphia: J. B. Lippincott & Co. 1882. 12mo, pp. 164. Price $1.

After refering to the discovery of quinine the history of its introduction in medicine is briefly alluded to, after which the action of quinine upon animals and man is considered, with observations on the various modes of administration, and the effects of small and excessive doses. This is followed by a chapter on the therapeutics of quinine sulphate. The little volume appears to have been carefully prepared, and the current and past literature on the subject to be well utilized. The total absence of a table of contents and of an index interferes with the usefulness of the work.

What to do in cases of Poisoning. By William Murrell, M.D., Lecturer on Materia Medica and Therapeutics at the Westminster Hospital, etc. Second edition. Detroit: Geo. S. Davis, 1882. 32mo, pp. 96. Cloth bound, embossed sides, colored edges. Price $1.

A little volume which may be conveniently carried in the pocket, and designed to give brief practical directions for the treatment of cases of poisoning. A list of the requisite instruments and remedies to be kept in the antidote bag, ready for use in case of emergency, is first given, after which the various poisons are considered in alphabetical order, the remedial agents being indicated by broadfaced type.

Second Annual Report of the Astronomer in charge of the Horological and Thermometric Bureaus in the Observatory of Yale College. 1881—1882.

Perhaps the most interesting portion to physicians and pharmacists of this report is the one on thermometers. During the past year 3,811 physicians' and 741 other thermometers were examined; such as have been used for a year or more give usually misleading indications.

Zur Frage der dem Fishleben schädlichen Flachsweichen. Von Edwin Johanson.

On the noxious influence of the water-retting of flax upon fish-life.

The experiments of the author lead to the conclusion that the sickness and death of fishes in creeks used for flax-retting is due to the rapid disappearance from the water of oxygen during the process.

Report on Surgery. By Professor W. O. Roberts, M.D. Louisville. Pp. 16. A reprint from the "American Practitioner," June, 1882.

THE AMERICAN

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OCTOBER, 1882.

COTTON SEED OIL. SOME OF ITS USES IN PHARMACY, AND ITS DETECTION WHEN MIXED WITH OLIVE OIL.

By S. S. Bradford, Ph.G.

Having had occasion during the last six years to manufacture lead plaster in considerable quantities, it occurred to me that cotton seed oil might be used instead of olive oil, at less expense, and with as good results. The making of this plaster with cotton seed oil has been questioned, as according to some authorities the product is not of good consistence, and is apt to be soft, sticky, and dark colored, but in my experience such is not the case. If the U. S. P. process is followed in making this plaster, substituting for the olive oil cotton seed oil, and instead of one-half pint of boiling water one and one-half pint are added, the product obtained will be equally as good as that from olive oil. My results with this oil in making lead plaster led me to try it in making the different liniments of the Pharmacopœia, with the following results:

Linimentum Ammoniæ.—This liniment, made with cotton seed oil, is of much better consistency than when made with olive oil. It is not so thick, will pour easily out of the bottle, and if the ammonia used is of proper strength will make a perfect liniment.

Linimentum Calcis.—Cotton seed oil is not at all adapted to making this liniment. It does not readily saponify, separates quickly, and it is almost impossible to unite when separated.

Linimentum Camphoræ.—Cotton seed oil is far superior to olive oil in making this liniment, it being a much better solvent of camphor. It has not that disagreeable odor so commonly found in the liniment.

Linimentum Chloroformi.—Cotton seed oil being very soluble in chloroform, the liniment made with it leaves nothing to be desired.

Linimentum Plumbi Subacetatis.—When liq. plumbi subacet. is mixed with cotton seed oil and allowed to stand for some time the oil assumes a reddish color similar to that of freshly-made tincture of

myrrh. When the liquor is mixed with olive oil, if the oil be pure no such change takes place. Noticing this change, it occurred to me that this would be a simple and easy way to detect cotton seed oil when mixed with olive oil. This change usually takes place after standing from twelve to twenty-four hours. It is easily detected in mixtures containing five per cent. or even less of the oil, and I am convinced, after making numerous experiments with different oils, that it is peculiar to cotton seed oil.

Charlestown, Mass., September, 1882.

AMMONIUM IODIDE.

BY JOHN A. LAMBERT, PH.G.

From an Inaugural Essay.

The author discusses the various methods which have been proposed and arrives at the conclusion that acceptable results are obtained by the process adopted by the U. S. Pharmacopœia of 1870, provided the error be corrected in the relative proportion of potassium iodide and ammonium sulphate, so that for 332 parts of the former 132 parts of the latter salt are used. It is further suggested that the salts be dissolved separately in cold instead of boiling water, and that in the evaporation to dryness the liquid be kept alkaline by the occasional addition of ammonia; with these modifications the process will yield an uncolored salt, which, however is more deliquescent and more readily decomposed on exposure than the salt prepared from pure hydriodic acid and ammonia. Made by the latter process, the salt will cost about 50 per cent. more than when prepared by the modified officinal formula; it is then white and granular, and on exposing small quantities for one or two weeks in a rather moist atmosphere, they remained dry and only began to show signs of deliquescence at the end of that time.

Ten commercial samples of ammonium iodide were procured in different parts of the country for examination. One of these samples contained ·085 per cent. of free iodine. The remaining nine samples were tested qualitatively and the amount of ammonium iodide estimated by decinormal solution of nitrate of silver, using chromate of potassium as an indicator. A definite quantity of the salt was dissolved in distilled water, a little chromate was added, and the liquid precipitated by the volumetric solution until a slight red color

remained permanent. Each cubic centimeter of the silver solution being equivalent to ·0145 gram of ammonium iodide, the amount of pure iodide was readily calculated. The results were as follows:

Weight of salt, gm.......	·0668	·1795	·1905	·0886	·2335	·123	·2045	·2451	·310
Vol. solution, cc...........	4·6	12·35	12·5	6·1	15·8	8·2	14·	16·6	21·3
Pr. ct. of Am I, airdry	99·83	99·76	95·14	99·83	98.11	96·666	99·26	98·20	99·629
" " at 110°C.	99·907	100·	100·	100·	100·	99·675	100·	100·	100·

COMMERCIAL POTASSIUM BROMIDE.

BY JULIUS WAY, PH.G.

From an Inaugural Essay.

When pure, potassium bromide crystallizes in the monometric or regular system, some of the crystals forming nearly perfect cubes which are colorless, but as met with in commerce they are white, owing to the presence of a trace of carbonate. They closely resemble the crystals of potassium iodide, but are entirely destitute of odor. The taste is pungent and saline, but much more agreeable than that of the iodide. Potassium bromide is freely soluble in water, and sparingly soluble in alcohol, requiring for solution about 200 parts of the latter solvent.

Commercial potassium bromide is always contaminated with chloride, it being impossible to entirely free the bromine, from which it is prepared, from chlorine without increasing the cost of the former to a considerable extent. Owing to this fact about 2 per cent. of chloride must usually be admitted in the commercial salt. Ten samples were obtained from different sources and carefully analyzed to determine the presence of impurities. The aqueous solution tested with litmus was found in every case to have an alkaline reaction.

The salts were then qualitatively analyzed. All the samples were found to contain chloride, six a small amount of sulphate and one carbonate of potassium. No metallic impurities were present in either of the samples.

The amout of chloride in each sample was volumetrically estimated by means of a decinormal solution of argentic nitrate, using potassium chromate as an indicator. The manner of determining the percentage of chloride was as follows:

A definite quantity of the salt was dissolved in distilled water and the solution of argentic nitrate gradually added from a burette until the salt was completely precipitated, and the amount of silver solution

required was noted. From this the percentage of chloride was calculated in the following way.

For example, 1 gram of the bromide was used. According to their combining powers, 1 gram of potassium bromide, if perfectly pure, would require for complete precipitation 84·03 cubic centimeters of the argentic nitrate solution. 1 gram of potassium chloride, if perfectly pure, would require for complete precipitation 134·22 cubic centimeters of the argentic nitrate solution. The difference between the volume of silver solution required for the two salts would then be 134·22—84·03=50·19; and since 50·19÷100=·5019 it follows that for each ·5019 cubic centimeters of the silver solution used, above the amount required for pure bromide, 1 per cent. of chloride is indicated. The sample containing carbonate was previously neutralized by nitric acid.

The amount of potassium chloride present was determined to be 1·10, 1·39, 1·55, 1·97, 2·24, 2·25, 3·44, 4·88, 5·98 and 6·92 per cent., or for the ten samples an average of 3·17 per cent.

FERRATED ALBUMEN.

By George Buchner, of Munich.

From the author's investigations and observations on compounds of ferric chloride with albumen we make the following abstracts:

The amount of chloride in egg-albumen was determined by ignition with sodium carbonate and titration with nitrate of silver; 1·6 per cent. Cl was found. The chlorine of the compound was determined in the same manner, deducting the chlorine of the albumen. The iron was estimated by ignition, dissolving in hydrochloric acid, reduction to ferrous salt by zinc, and titration by potassium permanganate.

1. Solution of ferric chloride (1:20) was added to a filtered solution of albumen (1:10) until the voluminous yellowish-brown precipitate was just dissolved. In the clear red-brown liquid albumen as well as ferric chloride responded to the usual reagents. On evaporating this liquid at a temperature not exceeding 50°C. and drying the gelatinous mass at the same temperature, a dark-brown powder or transparent brown-red scales were obtained, only partly soluble in water, the insoluble portion becoming transparent and gelatinous. Analysis: Fe 2·193, Cl 7·980, albumen 89·827 = Fe_2Cl_6 6·354, excess of Cl 3·819.

2. The preceding product was thoroughly washed with water and

the residue dried at 50°C. Analysis: Fe 1·488, Cl 2·700, albumen 95·812 = 4·119 Fe_2Cl_6, excess of iron as $Fe_2(OH)_6$ 0·131.

3. On slowly evaporating the original ferrated albumen solution the liquid becomes turbid, separating a thick jelly, which is soluble in warm water, yielding a clear solution which is not precipitated by boiling. The jelly, well drained, pressed and thoroughly dried over sulphuric acid, yielded Fe 0·998, Cl 4·531, albumen 94·471 = Fe_2Cl_6 2·895, excess of Cl 2·634. The powder was completely soluble in water and the solution was not disturbed by boiling or by alkalies; acids caused a precipitate of albumen, while sodium chloride and potassium sulphocyanide precipitated ferrated albumen.

4. The original ferrated albumen solution was completely precipitated by a saturated solution of table salt; the precipitate was collected upon a filter, drained, pressed, the press cake rapidly washed by agitation with water and decantation, again pressed between bibulous paper and dried over sulphuric acid. The powder swells with water, and dissolves after some time to a solution which is not disturbed by silver nitrate, but is precipitated by potassium sulphocyanide; its composition is Fe 1·703, Cl 1·680, albumen 96.617 = Fe_2Cl_6 2·563, excess of iron as $Fe_2(OH)_6$ 1·566.

5. The original solution of ferrated albumen was mixed with excess of ferric chloride and precipitated by table salt; treated as before, the powder contained Fe 1·15, Cl 1·78, albumen 97·07 = Fe_2Cl_6 2·715, excess of iron as $Fe_2(OH)_6$ 0·41· It behaved to reagents like the preceding. Both if left in prolonged contact with water, while being washed, become transparent, gelatinous and then dissolve.

6. The original solution yields with excess of ferric chloride, on standing, a precipitate which, treated as before, gave a powder containing Fe 1·25, Cl 4·48, albumen 94·27 = Fe_2Cl_6 3·627, excess of Cl 2·103.

7. The original ferrated albumen solution was dialyzed, the water being renewed until silver nitrate ceased to give a reaction. The contents of the dialyser had a neutral reaction and could be readily filtered. The liquid was not disturbed by boiling, by alcohol, caustic alkalies, carbonic acid gas, or silver nitrate. It was colored violet-blue by tannin, and green, without precipitate, by ammonium sulphydrate. Nitric and hydrochloric acid caused a precipitate of albumen, the solution being yellow; lime-water a brownish-yellow precipitate; potassium ferrocyanide a bluish-green precipitate, turning dark-blue on the

addition of hydrochloric acid; potassium ferridcyanide a green precipitate not altered by hydrochloric acid; potassium sulphocyanide a yellowish-brown precipitate, the solution becoming deep red on the addition of hydrochloric acid; sodium chloride a light yellowish-brown precipitate.

The liquid, evaporated at a moderate heat, yielded brown-red, nearly tasteless scales, which retained their solubility in water, the solution on being kept for a year becoming slightly mouldy, but not putrid. The scales contained Fe 1·1715, Cl 0·510, albumen 97·775 = Fe_2Cl_6 0·778, excess of iron as $Fe_2(OH)_6$ 2·765.

It is obvious from the foregoing that these products are readily altered and cannot be of uniform composition unless obtained under precisely identical conditions of temperature, dilution, action of water, etc. It is remarkable that with the entrance of $Fe_2(OH)_6$ into the compound these products become soluble in water and non-coagulable by heat, properties which, together with the peculiar behavior to reagents, are best observed in the dialyzed product, and result from a relatively small amount of iron. The difficulties of studying the nature of such products are increased by the uncertainty of determining the water without altering the composition, and of ascertaining whether definite compounds or mixtures of such are under investigation.

The formation of iron-albuminates may be used for proving the presence of albumen. A very diluted solution of albumen, which is scarcely rendered opalescent by boiling, if mixed with a saturated solution of table salt, yields on the addition of a little ferric chloride, near the point of contact a yellowish-white zone, and on agitation, at first a dense turbidity, changing after a while to a rather voluminous precipitate.

On digesting iron in solution of albumen for a few days a yellowish-brown liquid is obtained, which on evaporation at a moderate heat yields light-brownish red scales, similar in behavior to the dialyzed ferrated albumen; in two cases 1·2 and 2 per cent. of iron was obtained. Freshly precipitated ferric hydroxide dissolves in albumen; the dry product contained 0·65 Fe = 1·24 $Fe_2(OH)_6$. Ferrous hydroxide is very slightly soluble in albumen.—*Archiv d. Pharmacie*, June, 1882, pp. 417–425. J. M. M.

REACTIONS OF THE ACETATES OF CHROMIUM, IRON, AND ALUMINIUM.

By B. Reinitzer.

Ferric and aluminic salts, boiled with a quantity of sodium acetate sufficient to convert them into acetates, deposit the whole of the iron and aluminium as basic acetates, probably in consequence of the resolution of the normal acetates formed in the first instance into basic salts and free acetic acid. Respecting the behavior of chromic salts under similar circumstances, the statements of different authors do not quite agree. Schiff (" Annalen," 124, p. 168) states that when normal chromic acetate is boiled with water, no decomposition takes place; whereas, according to O. Wallach (" Tabellen zur chem. Analyse," 1880), chromic salts, like the salts of iron and aluminium, yield, when boiled with sodium acetate, a precipitate of chromic acetate.

According to the author's experiments a solution of chloride or sulphate, boiled with excess of sodium acetate, yields no precipitate. If the boiling be continuel for a short time only, the solution turns violet on cooling; and in the solution thus altered no precipitate is formed by potash, soda, ammonia, ammonium hydrosulphide or carbonate, sodium phosphate, barium hydroxide, or barium carbonate. Potash, soda, and baryta turn the solution green, and after 12 to 24 hours convert the liquid into a green jelly; ammonia forms a violet jelly. The precipitation is accelerated by heat in all cases except with sodium phosphate, which forms no precipitate, even when aided by heat.

A similar passivity towards the reagents above mentioned is imparted by the chromic solution to a certain quantity of ferric or aluminic acetate. Neither by heating to the boiling point nor by addition of caustic alkalis or ammonia, or their salts, can ferric or aluminic acetate be detected in presence of chromic acetate. In such a mixed solution ammonium sulphide alone produces a slow but complete precipitation of the iron, whereas alumina is not completely precipitated in the cold by any reagent whatever. A given quantity of chromium, however, can protect from precipitation only a limited quantity of ferric oxide or alumina; and, what is especially remarkable, it can protect a considerable quantity only when the chromic solution has been boiled with the sodium acetate before the addition of the ferric or aluminic solution. From these results it follows that, in presence of chromic salts, the method of separation founded on the precipitation of iron and

aluminium in the form of basic acetates, becomes utterly useless, either for qualitative or for quantitative analysis.

The influence of a chromic salt on the precipitation of ferric or aluminic salts varies to a certain extent according as to whether it is in the violet or the green modification. When a green solution of chromic acetate is mixed with a small quantity of ferric acetate, and the mixture is boiled, the iron is separated in the form of a flocculent precipitate; but if a solution of ferric acetate be added to an originally violet solution of chromic acetate and the mixture boiled, then, whatever may be the quantity of ferric solution added, no precipitation of iron will take place. Exactly the same is the case with a violet solution of chromic acetate obtained by boiling a green solution with sodium acetate; also with a green chromic acetate solution boiled without any addition. Green chromic acetate, therefore, acts like most metallic salts when heated, in precipitating a solution of ferric acetate; whereas violet chromic acetate, so far from producing a precipitate, even renders a large portion of the iron acetate as indifferent towards reagents as itself. Thus, when a violet solution or a boiled green solution of chromic acetate is boiled with a moderate quantity of ferric acetate solution, sodium acetate may then be added and the liquid boiled, without precipitation of the iron. Neither is any action produced in such solutions for a long time at ordinary temperatures by any of the reagents—such as caustic alkalis, ammonia, caustic baryta, alkaline carbonates and phosphates, barium carbonate, or potasssium ferrocyanide—which precipitate ferric salts under normal circumstances, precipitation not taking place indeed until after several hours' boiling. The quickest action is produced by ammonium sulphide; but even in this case a decided retardation takes place, as compared with the rate of precipitation in pure solutions of ferric acetate. If the quantity of ferric acetate added exceeds a certain limit, boiling with sodium acetate or addition of caustic ammonia, etc., gives rise to partial separation of the iron.

The quantity of ferric acetate rendered passive by a given quantity of chromic acetate depends upon several circumstances, the most influential of which are the amount of chromic acetate present, the concentration of the liquid, and the temperature at which the acetates act on one another. It increases up to a certain limit with the temperature and the dilution of the solutions, and, so long as the heat is kept below the boiling point, with the duration of the action.

Aluminium acetate is acted upon by chromic acetate in the same manner as ferric acetate, excepting that the aluminium is not precipitated, like iron, by boiling with green chromic acetate. The behavior of the mixed solutions of aluminic and chromic acetates towards sodium acetate, ammonia, and caustic alkalis, is exactly similar to that which is observed in mixtures of chromic and ferric acetates.—*Jour. Chem. Soc.*, Aug. 1882; from *Monatsh. Chem.*

PREPARATION OF SOFT SOAP.

According to Ringel ("Seifenfabrikant," 1881, 82), pure soft soap consists mainly of potassium oleate, potassium carbonate, and the salts contained in the potash used for its preparation. Pure potassium oleate obtained from soft soap by treatment with potassium chloride is a firm, tough, slightly translucent mass. Soft soap does not acquire its translucent appearance and ductile character until after the addition of a solution of caustic and carbonated alkali. Instead of finishing soaps with potash, potassium chloride, sulphate, borate, silicate, etc., may be used; sodium salts, however, produce soaps of less perfection. These salts have the property of causing the soap to combine with water; 100 parts of water require 12 to 15 parts of these salts to effect this combination, so that no watery particles separate on cooling.

For the preparation of green soft soap Starke ("Seifenfabrikant," 1881, 83) uses hempseed oil, linseed oil, and oleïn. The fat is introduced into the copper, mixed with an equal weight of ley of 18° to 20°B. ($\frac{2}{3}$ potash-ley and $\frac{1}{3}$ soda), agitated repeatedly, allowed to settle until the next day, and then heated to boiling. Combination soon takes place, and may be recognized by the absence of oil, which at the commencement floated on the surface of the ley, and by the fact that a sample placed on the tongue no longer tastes of alkali, but has a sweetish taste resembling oil. The mixture is now subjected to gentle boiling, and treated gradually with ley of 20 to 24°B. until a transparent emulsion is produced. At this period the fire is increased and the boiling continued until the soap shows large lamellæ on the sides of the copper, and only very little froth is produced. The soap when finished should remain clear an cooling.

According to Eichbaum ("Seifenfabrikant," 1881, 85), one of the best soft soaps is the so-called "natural grain-soap," which is made from potash ley (containing not more than 5 per cent. of soda) and

German linseed oil. Saponified oleïn and twice purified cotton-seed oil are used in some cases.

Seidemann ("Seifenfabrikant," 1881, 153) describes the preparation of transparent glycerol soft soap. The oils used for the manufacture of this soap must be bleached. In other respects the preparation resembles that of other soft soaps. The bleaching is effected in the following manner: The oil is heated with direct steam and mixed with 5 to 8 per cent. of potash-ley of 28°B. It is agitated thoroughly, then allowed to remain quiescent. The precipitate which subsides is used for the manufacture of darker-colored soaps.

In order to prevent the freezing of transparent soap it is recommended to use linseed oil in its preparation. For washing woolen goods, Menzies ("Seifenfabrikant," 1881, 169) recommends the use of neutral potash soap, which is said to supersede soda soaps.—*Jour. Chem. Soc*, Aug., 1882; from *Dingl. polyt. J.*, vol. 244.

POTASSIO-BISMUTHOUS IODIDE AS A TEST FOR ALKALOIDS.

By F. Mangini.

Dragendorff, in his Manual of Toxicology, recommends this compound as one of the most delicate tests for alkaloids, but adds that it cannot be employed to distinguish one alkaloid from another, as it gives orange-colored precipitates with most of them. The author of the present paper, however, finds that the characters of this reagent vary considerably according to the manner in which it is prepared. When obtained by the process described by Dragendorff,[1] it produces a turbidity even in pure water; but when prepared by mixing 3 parts potassium iodide with 16 parts liquid bismuth iodide and 3 parts hydrochloric acid, it does not give any turbidity with water, and is an extremely delicate test for alkaloids, serving also to distinguish many of them one from the other by the various gradations of color of the precipitates and their alterations after long standing.

The following are the results obtained:

[1] Dragendorff's directions are ("Phar. Zeits. f. Russland," v., p. 82): Dissolve bismuth iodide in warm concentrated aqueous solution of potassium iodide and add of the latter solution a bulk equal to that required for dissolving the bismuth iodide. Editor Am. Jour. Phar.

Strychnine: light yellow precipitate becoming dark yellow after some time; supernatant liquid remains clear.

Morphine: reddish-yellow precipitate which agglomerates at the bottom; liquid remains clear, precipitate disappearing after a few days if the whole is left at rest, and the liquid becoming canary-yellow.

Codeine: immediate, copious, yellowish-red precipitate, remaining for some time suspended in the liquid, and assuming a light brick-red color when left at rest.

Atropine: precipitated at first in filaments, but gradually settling down in the form of a reddish-yellow powder, which if left at rest becomes canary-yellow, and dissolves after some time, coloring the liquid golden-yellow.

Aconitine: precipitated at first in flocks, but suddenly forms at the bottom a chrome-yellow pulverulent precipitate, which does not change color when left at rest, whereas the liquid becomes yellow.

Brucine: precipitated at first in filaments which ultimately settle down with gold-yellow color, becoming paler when left at rest for some time.

Nicotine: immediate red pulverulent precipitate, which suddenly falls to the bottom, and becomes reddish-yellow when left at rest.

Cicutine: precipitate similar in character but of darker color, and becoming dirty-white when left at rest.

Solanine: slowly precipitated with lemon-yellow color, becoming darker on repose and adhering to the bottom of the tube when shaken.

Veratrine: light yellow precipitate forming slowly, remaining suspended for some time, and becoming light canary-yellow when left at rest.

Narceine: light yellow precipitate forming slowly and remaining suspended like that of veratrine, but of deeper color; becomes reddish-yellow on repose.

Quinine Sulphate: immediate brick-red precipitate which suddenly falls to the bottom, and becomes dirty-yellow on repose; remains suspended after agitation.

Cinchonine Sulphate: like the last, but does not fall down so quickly, and acquires a darker color when left at rest.—*Jour. Chem. Soc*, 1882; from *Gazetta*, 1882, p. 155.

PRESENCE OF NICOTINE IN TOBACCO-SMOKE, AND CONSIDERATION OF THE ACTIVE POISON IN THE COMBUSTION-PRODUCTS OF TOBACCO.

By R. Kissling.

Having recognized the toxic nature of nicotine and its action on the nervous system, and the relatively considerable quantity of this alkaloid present in tobacco, it was obviously interesting to ascertain what influence the most important consumption of tobacco, viz., smoking, has on nicotine. Although the number of investigators on this subject is very limited, a complete series of chemical and physiological facts can nevertheless be quoted. Whilst a few investigators indisputably deny the presence of even traces of nicotine in tobacco-smoke, others maintain with equal certainty that it exists in considerable quantity. The author has collected these facts, and the present paper is devoted to a critical discussion of the same, and simultaneously to an account of his own investigations. The following are the details of the principal publications on this subject: Unverdorben (" Pogg. Ann.," 1826, 8, 399) investigated the products obtained by the dry distillation of tobacco. He obtained (1) an etherial oil; (2) an oily acid; (3) an empyreumatic acid; (4) a reddish-brown resinous substance, soluble in potassium hydroxide; (5) a trace of a powdery substance, insoluble in potash and in acids; (6) a small quantity of picoline; (7) a base soluble in water, having a burning taste and unpleasant pungent smell, causing choking; (8) fuchsine; (9) a body resembling the latter; (10) two extractiform bodies.

Zeise (" Annalen," 47, p. 212) was the first who passed tobacco-smoke from a pipe through an aspirator. He found the following constituents: A peculiar empyreumatic oil, butyric acid, carbonic anhydride, ammonia, paraffin, empyreumatic resin, water, a small quantity of acetic anhydride, carbonic oxide, and carburetted hydrogen gas.

Melsens (*ibid.*, 49, p. 353) has investigated the condensation-products of tobacco-smoke with the view of proving the presence of nicotine. He isolated nicotine from this mixture of empyreumatic, oily, tarry, and resinous products, and obtained numbers agreeing with the formula $C_{10}H_{14}N_2$; 4·5 k. of smoked tobacco yielded 33 grams of nicotine.

Vohl (*ibid.*, 148, p. 231), in conjunction with Reichshauer, found sulphuretted hydrogen and hydrocyanic acid in tobacco-smoke. Vohl and Eulenberg (" Vierteljahrsschr. f. gerichtl. und öffentl. Medecin,"

New Edition, 14, p. 249) conclude that nicotine in tobacco is completely decomposed by the smoking process, and that the intense action of tobacco-smoke on the nervous system is attributable to the presence of pyridine bases. The following pure substances were isolated: A hydrocarbon of the formula $C_{38}H_{18}$; pyridine, C_5H_5N; picoline, C_6H_7N; lutidine, C_7H_9N; collidine, $C_8H_{11}N$; parvoline, $C_9H_{13}N$; coridine, $C_{10}H_{15}N$; rubidine, $C_{11}H_{17}N$; and viridine, $C_{12}H_{19}N$. The presence of the following substances was also established: Carbonic anhydride, hydrocyanic acid, sulphuretted hydrogen, formic acid, acetic anhydride, propionic acid, butyric acid, valeric acid, carbolic acid and creasote, several hydrocarbons of the acetylene group, finally ammonia, methane, and carbonic oxide. The presence of caproic, caprylic, and succinic acids could not be determined conclusively.

Heubel ("Centralbl. med. Wissensch.," 1872, 641) has made numerous physiological experiments on tobacco. He concludes that—(1) nicotine is unmistakably contained in tobacco-smoke; (2) by the slow combustion of the nicotine in tobacco, a large quantity is found in the smoke; (3) the fact that in spite of its great volatility and tendency to decomposition, nicotine is largely contained in tobacco-smoke, is explained by the leaves and the smoke containing this alkaloid as a stable salt, and not in the free state.

Le Bon ("la Fumée du Tabac, Recherches Chimiques et Physiologiques") has found the following constituents in tobacco-smoke: Nicotine, ammonia, carbonic oxide, hydrocyanic acid, and two aromatic (not in a chemical sense) substances, one of which is collidine.

Pease ("Jour. Amer. Chem. Soc.," 2, p. 338) analyzed the smoke from 3·6685 grams Havanna tobacco by burning the latter in a long wooden pipe, and passing the smoke through two bottles containing water acidified with sulphuric acid. The filtered and concentrated solution was then tritrated with potassiomercuric iodide. He obtained 0·081 gram nicotine.

In discussing these facts the author mentions that, of the two bases found by Unverdorben in addition to picoline, one probably was nicotine Zeise's investigations are of great importance. It cannot be disputed that by the dry distillation, of tobacco, other products are formed than by the smoking process, as in the latter case a constant or intermittent current of air passes through the tobacco. Referring to Melsens' researches, the author mentions that he is the only investigator who has conclusively established the existence of nicotine in

tobacco-smoke. The quantity of this alkaloid amounts to about 0·7 per cent. of the weight of tobacco consumed, and about 15 per cent. of the total quantity of nicotine contained in tobacco. In conclusion of the first part of his paper, the author criticises the researches of Vohl, Heubel, Le Bon, and Pease. He shows that Vohl's opinion as to the non-existence of nicotine in tobacco-smoke is without foundation. This chemist evidently disregarded the fact that nicotine is decomposed by warm potassium hydroxide. The remaining three publications cannot be regarded as a satisfactory solution of the whole question of controversy of opinion, as they are very incomplete.—*Jour. Chem. Soc.*, Aug. 1882; from *Dingl. polyt. J.*, vol. 244.

SOLUBLE SALTS OF CAFFEINE.

By C. Tanret.

Hitherto, in consequence of its slight solubility, caffeine has been administered hypodermically only in very small doses; in fact, at the ordinary temperature, it requires 93 parts of water to dissolve it, so that a cubic centimeter would contain scarcely more than a centigram. Most of the salts of caffeine mentioned in therapeutical works do not exist, and those that do cannot be employed, because upon being dissolved they are decomposed into acid and caffeine, the latter being precipitated if the water is not in the proportion required for the solution of the free alkaloid.

The alkaloidal properties of caffeine are extremely weak; it is perfectly neutral in its behavior towards litmus, while the ordinary reagents for alkaloids do not precipitate it unless its solutions are relatively very strong. Not being alkaline, caffeine is incapable of saturating the smallest quantity of acid, and although it forms salts with certain acids these salts are far from being as stable as those of most of the other alkaloids, as will be seen upon considering its behavior with the acids most frequently employed.

Acetic acid dissolves caffeine freely. If this solution be allowed to evaporate spontaneously the acid volatilizes entirely and there remains, not a salt of caffeine, but pure caffeine. An acetate of caffeine, therefore, does not exist.

Neither does valerianic acid form with it a valerianate of caffeine. If caffeine be saturated hot with a very strong solution of this acid,

upon cooling it will deposit, not valerianate of caffeine, but simply caffeine, entirely soluble in chloroform and only retaining mechanically traces of the acid, sufficient to impart the odor. The acid titrate of the solution remains the same as before the addition of the caffeine, which proves clearly that the caffeine has not carried down with it a sensible quantity of the acid in its precipitation. Also when caffeine and valerianic acid are placed together under a bell glass, as in the preparation of valerianate of ammonia, the caffeine only becomes impregnated with the odor of the acid. I have verified this fact upon commercial "valerianate of caffeine" occurring in fine crystalline needles resembling those of caffeine, a character that was very natural, since it was only caffeine with a valerianic odor. Exposure to the air and simply washing removed this odor.

Lactic acid does not combine with caffeine to form a lactate. Syrupy lactic acid, saturated in the cold with caffeine remains syrupy indefinitely; and, as in the case of valerianic acid, pure caffeine crystallizes out upon the cooling of a lactic acid solution that has been saturated while hot.

It is the same with citric acid, which does not give a citrate. The product which is decorated with this name is only a mixture of caffeine and acid.

Another circumstance goes to prove further the non-existence of these pretended salts of caffeine and organic acids. Whilst, for example, citric acid, which is tribasic, requires for the formation of citrates three equivalents of base, one or two of which can be replaced by one or two equivalents of water, there is required to effect the solution of one equivalent of caffeine in water a quantity of acid represented in weight by about three equivalents of acid. The relations are, therefore, precisely the inverse of those which should obtain in the formation of a citrate. To sum up, organic acids do not form definite salts with caffeine. They augment, it is true, its solubility in water, but without combining with it, and since the acidity of the acids is in no way modified by caffeine, it will be evident that with solutions of caffeine in organic acids there would be injected a quantity of free acid several times the weight of the dissolved caffeine.

With mineral acids the conditions are different. Sulphuric acid forms with caffeine a sulphate that crystallizes with difficulty. Hydrochloric and hydrobromic acids on the contrary form salts that are easily obtainable in very fine crystals. These salts are perfectly defi-

nite and have been described; but they are not stable, and water decomposes them into free acid and caffeine, which precipitates or not according to the quantity of water employed. They are also altered by the air, and the crystals of the hydrochlorate when exposed effloresce rapidly, losing their acid. After a time, more or less long, according to the temperature, nothing remains but caffeine. Therefore, from this point of view, the salts of caffeine formed with mineral acids do not present any advantage over pure caffeine.

In presence of these negative results, I had the idea of employing the natural salt which holds the caffeine in combination in coffee, the chlorogenate of potash and caffeine of Payen. But that salt is very difficult to obtain in any considerable quantity, and this presents an obstacle to its employment in the ordinary way, besides which when in solution the salt is very alterable in the air. Moreover it contains only 29 per cent. of caffeine, and in the cold requires to dissolve it several times its weight of water, which gives solutions still less charged with caffeine.

It occurred to me then, in view of the apparent similarity that exists between chlorogenic or caffetannic acid and benzoic, cinnamic and salicylic acids, that double salts analogous to Payen's salt could be formed with the three last-named acids, and my conjecture proved correct.

In the presence of benzoate, cinnamate or salicylate of soda caffeine dissolves in a very small quantity of water and forms thus very soluble double salts that are very rich in caffeine. That there is in this case more than a simple solution is proved by the fact that for a definite weight of caffeine there is required a definite weight of the alkaline salt; in other words, combination takes place according to the equivalents of these various bodies. But this combination is rather weak, since if the salts be treated with chloroform they give up to it all their caffeine. In my opinion these double salts may be best compared with hydrated salts, which lose their water of crystallization when treated with a neutral liquid in which water is soluble. In this way blue sulphate of copper loses its water of crystallization and becomes white when immersed in absolute alcohol.

Cinnamate of soda dissolves caffeine in water equivalent for equivalent, 170 parts of cinnamate for 244 of caffeine. The double salt thus obtained contains 58·9 per cent. of caffeine.

Benzoate of soda and caffeine contains for two equivalents of ben-

zoate of soda (288), one equivalent of caffeine (244), or 48·5 per cent. of caffeine.

The double salt richest in caffeine can be obtained with salicylic acid. An equivalent of salicylate of soda (160) allows of the solution of an equivalent of caffeine (244), which gives 61 per cent. of caffeine in this double salt.

The solubility of these double salts is such that solutions can be easily obtained with the benzoate and cinnamate of soda containing 20 centigrams per cubic centimeter, and with salicylate of soda as much as 30 centigrams.

Benzoic, cinnamic and salicylic acids having supplied me with what I was in search of, I have not thought it necessary to ascertain to what extent analogous results might be obtained by employing those acids in combination with other bases than soda. I may mention, however, that I have been able to obtain double salts with acetic, lactic, citric, sulphuric and hydrochloric acids.

With these new salts, therefore, it will be possible in future to administer caffeine hypodermically. It is true that the alkaline salts associated with it have their own peculiar action; but this action is known, and consequently it will, according to the case and the dose, sometimes be ignored and sometimes taken account of; that will be a matter of therapeutics.

In conclusion, these salts may always be prepared extemporaneously by simple solution in water in the proportions given above. But since the commercial benzoate of soda has sometimes an alkaline reaction, it will be as well, in preparing hypodermic injections, to first neutralize the soda salts with the corresponding acids.—*Phar. Jour. and Trans.*, Aug. 5, 1882, from *Jour. de Phar.*. 1882, v. 591.

THE ACTIVE PRINCIPLE OF ADONIS VERNALIS.

By Dr. V. Cervello.

The use of the Ranunculaceous plant, *Adonis vernalis*, L., in some forms of heart disease has led to some physiological experiments from which it would appear that it is capable of exercising an action similar to that of digitalis, with the advantage that it is not cumulative, its administration during a considerable time being without danger. But hitherto nothing definite has been known with respect to the constituent

or constituents of the plant to which the action is due. The author, as a result of a chemical investigation of the plant, states that it contains only one active constituent, a glucoside, which he has named "adonidin."

In the preparation of adonidin the plant is cut into small pieces, which are macerated during two days in dilute (50 per cent.) alcohol; the liquid is filtered, the filtrate treated with basic acetate of lead, separated from the resulting precipitate by decantation and evaporated on a water-bath to a syrupy consistence. The residue, which is very bitter and has an acid reaction, is carefully made slightly akaline by the addition of ammonia solution, and then heated with a strong solution of tannic acid, which is added as long as any precipitate is formed. The precipitate is a compound of the active constituent and tannic acid, difficultly soluble in water. This is collected on a filter, washed with a small quantity of water and dried between paper. To decompose this tannic acid compound zinc oxide and some alcohol are added and the whole is heated in a water-bath until the liquid is evaporated, when the mass is treated with strong alcohol, filtered and the residue on the filter washed with much alcohol. The filtrate is yellow and contains the adonidin not quite pure. To purify it the solution is evaporated by a gentle heat to a small volume and ether added, when inactive colored matter is precipitated together with a trace of adonidin. Upon evaporation of the mixture of alcohol and ether by a moderate heat a residue is obtained, which represents pure adonidin and is finished by drying in a vacuum over sulphuric acid.

The quantity of adonidin obtained in this way, from two kilograms of *Adonis vernalis* was small; this the author does not consider due to any defect in the method of preparation, but to the fact that the compound, which is extremely energetic, is contained in the plant in relatively small proportion.

Adonidin is non-nitrogenous, colorless, odorless, amorphous, and extremely bitter. It is soluble in alcohol, but only slightly so in ether and in water. It is precipitated by tannic acid, the precipitate redissolving in much water. It is insoluble in dilute hydrochloric acid in the cold, but on being heated with the dilute acid it splits up into sugar and a substance insoluble in ether.

The author is not in a position to say whether the decomposition product has any action upon the organism, analogous to the case of

digitaliretin, obtained under similar conditions from digitalin by Schmiedeberg.

With respect to the physiological action of adonidin the author sums up the results of his experiments by stating that it may be described as identical with that of digitalin, with the single exception that it is far more powerful. He also confirms the statement that it is not cumulative.—*Phar. Jour. and Trans.*, Aug. 12, 1882; *Arch. f. exper. Path. u. Pharmak.*, xv.

QUASSIIN.

By A. Christensen.

The literature upon the chemical constituents of quassia wood is very inconsiderable. In 1806 Thomson ("System der Chemie," iv, 47,) mentioned that by digesting quassia wood with water and evaporating he obtained a very bitter substance, which when warm was soft, and became brittle upon cooling, and which, in his opinion, consisted principally of the pure bitter constituent; it gave a slight precipitate with tincture of galls. In 1811 it was stated by Pfaff ("System der Materia Medica") that the bitterness was completely extracted by cold water. In 1826 Buchner introduced 1 grain of the alcoholic extract into a wound in a rabbit, which was followed by the death of the animal. Another investigation of the extract by Keller (Buchner's "Repertorium," ii) contains nothing of importance.

Quassiin was first prepared by Winckler (Buchner's "Repertorium," liv. [1837], 85, and lxv. [1389], 74) in 1835 as follows. Three ounces of quassia wood were extracted with 2 pounds of 80 per cent. alcohol. After evaporation in a water-bath the residue was dissolved in water, and the solution filtered and evaporated to the consistence of an extract. The extract was exhausted with absolute alcohol, evaporated almost to dryness, and then again exhausted with boiling water. The light-yellow solution, decolorized by animal charcoal, left after slowly evaporating crystals of quassiin. Winckler described this substance as crystalline, difficultly soluble in water and freely in alcohol, faintly alkaline, giving a precipitate with tannic acid, and as being obtained crystalline most easily from water.

Subsequently Wiggers ("Annalen der Pharmacie," xxi [1837], 40,) prepared quassiin by repeatedly boiling 8 pounds of quassia wood with water, evaporating the filtered decoction to 6 pounds, cooling, adding lime and allowing the mixture to stand a day with frequent shaking

filtering, evaporating nearly to dryness and then boiling with 90 per cent. alcohol. From the solution, which according to Wiggers contained, besides quassiin and coloring matter, some sodium chloride and potassium nitrate, the alcohol was distilled off and it was then evaporated to dryness. The residue was dissolved in the least possible quantity of alcohol and mixed with a considerable quantity of ether, which separated much coloring matter. The filtrate was now again evaporated, and dissolved in absolute alcohol and ether and this repeated until the residue was colorless and free from saline matter. Lastly the etherial solution was poured into a small quantity of water and left to evaporate spontaneously.

Wiggers found for quassiin the formula $C_{20}H_{25}O_6$. According to him it loses 1·3 per cent. of water at 100°C., and 0·37 per cent. more upon fusing. The melting point, he says, lies a little above that of the resin. He found it dissolve in 220 parts of water at 12°C., and it did not neutralize acids. It crystallized by spontaneous evaporation from a solution in alcohol and ether which was mixed with water, and also when a warm saturated alcoholic solution was mixed with boiling water and allowed to cool. The quassiin of Wiggers was precipitated by tannic acid, but not by metallic salts.

In commencing the present investigation, Herr Christensen first directed his attention to find a new method of preparation, since the methods of Winckler and Wiggers yielded it in a very impure condition and the operations for its purification would involve considerable loss. The author tried two methods that are available in the extraction of several bitter substances: (1) treatment of a solution of the watery extract with bone black and exhaustion of this with alcohol; and (2) precipitation of the watery extract with tannic acid, decomposition of the washed precipitate, extraction with alcohol, etc. In both cases, by evaporating slowly, he obtained tabular crystals, having an intensely bitter taste, leaving on combustion no ash, difficultly soluble in water and fairly soluble in alcohol. The solutions gave with tannic acid a dense white precipitate.

Notwithstanding that the quassiin is tolerably completely removed by bone black, as is shown by the fact that the filtrate tastes only slightly bitter, the tannic acid method has the advantage that it yields the purer product. The following method was adopted by the author for the preparation of quassiin:

Five kilos of quassia were boiled several hours with two successive

quantities of water. The united filtrates were evaporated, at first over an open fire, subsequently on a water-bath, to $1\frac{1}{2}$ liter. After cooling this was filtered and the filtrate precipitated with tannic acid, taking care to keep the reaction neutral or faintly acid by the addition of carbonate of soda, since the compound of quassiin with tannic acid, like many similar compounds of bitter substances with that acid, is very soluble in it. The precipitate, after the addition of well-washed pipe-clay is easily collected and removed by filtration. The precipitate after being repeatedly washed was mixed whilst moist with a considerable quantity of freshly precipitated lead carbonate, and evaporated to dryness in small portions, with frequent stirring, upon a water-bath. The mixture was extracted four times with alcohol, the alcohol distilled off and the residual liquid evaporated until the separation of crystals of quassiin, which were washed and dried between filtering paper. The filtrate yielded more crystals upon further evaporation, and some more quassiin was separated by shaking it with chloroform. Lastly, the quassiin was recrystallized from ether-alcohol and water.

In the place of lead carbonate, calcium hydrate also was used for the decomposition of the tannic acid compound, and an alcoholic solution obtained that was not so much colored, but the yield was smaller.

Upon evaporating the watery extract of quassia wood, a considerable precipitate separated as a smeary mass. This was treated with freshly precipitated lead carbonate, evaporated almost to dryness and extracted with 84 per cent. alcohol. After the alcohol had been distilled off, and the liquid sufficiently evaporated, some quassiin separated, but in an impure condition.

Quassiin is very freely soluble in chloroform, and by shaking an aqueous solution of it with chloroform it can be nearly entirely removed. The author therefore tried to obtain the quassiin from the aqueous extract of quassia wood by simply shaking this with chloroform; but the practical difficulty was met with that the chloroform does not completely separate it, and a pasty, slimy mass was formed, the consistence of which was not altered even upon warming. After the chloroform had been distilled off a very impure residue was left, from which the quassiin was only obtained by repeated recrystallizations from ether-alcohol mixed with a little water. Neither can direct exhaustion of the quassia wood by chloroform be adopted in the preparation of the quassiin, since much resin is taken up with it, and this

can only be separated by the ether-alcohol method, which involves considerable loss. The last two experiments show, however, that quassiin exists as such in the wood, and is not a product formed during the treatment.

The quassiin, obtained as above described with tannic acid, was purified by recrystallization from the smallest possible quantity of warm alcohol, in which it is so much more soluble than in cold that the solution solidifies into a paste upon cooling. After the crystals had been washed with dilute alcohol and dried between filter-paper and then over sulphuric acid they were white and gave a colorless solution. They were recrystallized once more by the addition of boiling water to a hot concentrated alcoholic solution; the crystals that separated on cooling showed the same melting point as those of the first crystallization and were used in the further experiments.

With respect to the proportion in which quassiin occurs in the wood, the author obtained from 18 kilos of Jamaica wood ("Picræna excelsa") 12 grams of impure substance, equal to 0·6 per 1,000. But in treating a subsequent consignment, both of Jamaica and Surinam wood, he found to his surprise that in repeated experiments upon considerable quantities of both kinds he could obtain scarcely any quassiin. A sample of Quassia amara wood, that yielded 2·8 per cent. of extract, and one of Picræna excelsa wood, that yielded 2·6 per cent., yielded no quassiin. The sample of Picræna excelsa wood that gave 0·6 per 1,000 of quassiin yielded 3·2 per cent. of extract. The author is unable to explain the cause of this difference; but if the value of quassia wood is dependent upon the proportion of quassiin it contains, the results do not afford much justification for the exclusion of the Jamaica wood from some pharmacopœias.

Pure qnassiin forms very thin rectangular double refracting crystalline scales. It has an intensely bitter taste, is without smell, permanent in air, and gives neutral solutions with alcohol, water, etc. It melts at 205° with slight puffing—possibly due to the giving off of water—to a yellow resin-like mass, which upon solution and recrystallization is recognized as unaltered quassiin.

Water left in contact with finely powdered quassiin several days, with frequent shaking, at 15°C., dissolved 1 part in 1,230. A warm saturated solution left forty-eight hours at 15°C., with frequent shaking, contained 1 part in 735. Boiling water dissolves quassiin with difficulty, but much more freely than cold. In alkalies it

dissolves with a yellow color very readily upon boiling and separates unaltered on the addition of acids, becoming again colorless. It is dissolved by alkalies in the cold somewhat more easily than by water, turbidity resulting upon neutralizing the liquid with acids. Boiling alcohol dissolves it very freely, but cold alcohol much less so, 1 part of quassiin requiring 30 parts of 84 per cent. alcohol at 15°C. In ether and petroleum spirit it dissolves with difficulty, but very freely in chloroform, of which 2·1 part dissolve 1 part of quassiin. A solution in chloroform is dextrogyre, the specific rotation being $a_d + 37{\cdot}8$.

Quassiin contains no nitrogen. After being dried to a constant weight over sulphuric acid, it did not alter in weight when exposed for an hour to a current of dry air at 100°C., and gave upon analysis results corresponding with the formula $C_{31}H_{42}O_9$.

	Calculated.	Found.
C	66·66	66·90
H	7.52	7·44
O	25·82	25·65

An aqueous solution of quassia is not rendered turbid by metallic salts. A saturated alcoholic solution gives no precipitate with a similar solution of neutral lead acetate, and upon evaporation the quassiin separates unaltered. Other saturated alcoholic solutions of metallic salts behaved similarly. Tannic acid produces in aqueous and alcoholic solutions of quassiin a white precipitate which is soluble in acids and in caustic and carbonated alkalies.

Dilute hydrochloric and sulphuric acids dissolve quassiin in the cold somewhat more freely than water, but 3 to 10 per cent. solutions, even after being heated in sealed tubes to 125° for an hour, did not reduce alkaline cupric tartrate, showing that quassiin is not a glucoside.

By treatment of quassiin with a 3 per cent. solution of sulphuric acid a new compound was obtained, crystallizing in fine needles, and having only a slightly bitter taste. It melted at 237°C., did not lose all its water of crystallization (four molecules) till 110° C., and when anhydrous gave upon analysis results corresponding with the formula $C_{31}H_{38}O_9$. It was very sparingly soluble in water, required 180 parts of alcohol at 15°, dissolved very freely in caustic potash and caustic soda, and gave no precipitate with tannic acid. There was also a formation of resinous matter that could not be crystallized and possessed an intensely bitter taste.

A strong solution of quassiin in chloroform decolorizes bromine, with formation of hydrobromic acid. The author obtained a bromine

compound as a white amorphous mass, with a taste even more bitter than that of quassiin; this compound dissolved in alkalies with an intense yellow color, distinctly produced by the smallest traces, and at the same time lost its bitter taste almost completely.

An experiment made to test statements as to the occurrence of an essential oil in quassia wood gave negative results, a small quantity of solid white substance that collected on the surface of the aqueous distillate proving to consist of free fatty acid.—*Phar. Jour. and Trans.*, August 19, 1882, from *Archiv.*, xx, 481.

THE PURIFICATION OF COMMERCIAL ALCOHOL.

BY A. RICHE.

It is known that in fermentation sugar does not split up exclusively into alcohol and carbonic anhydride, according to the equation of Gay-Lussac, and Pasteur has shown that glycerin and succinic acid are constantly formed during the alcoholic fermentation. Many others besides these four products make their appearance at the same time, several of which are not yet defined, but mention may be made of most of the alcohols and acids of the fatty series; the aldehydes, their isomers and various derivatives; and isopropylic acid.

Alcohol is now manufactured from the most varied materials; fresh and dried grapes; beetroot and beetroot molasses; various grains, such as barley, rye, maize and rice; saccharine fruits, as figs, dates, plums, and mulberries; and several starches. Some of the bodies contaminating commercial alcohol are derived from the material used as the source of the alcohol, and are only met with if the alcohol is derived from a particular material.

The temperature to which the fermented liquor is subjected in the distillatory columns also determines the formation of contaminating products, and notably of substances possessing a disagreeable odor and taste; so that the number of compounds affecting the purity of alcohol is very large and very diverse in nature. In weight they only represent a very small portion of the alcohol, but this quantity is nevertheless sufficient not only to give the alcohol a special flavor, but also to render it more injurious for consumption than pure vinic alcohol.

It is, therefore, very important to free the alcohol from these impurities. At first it was hoped that this could be done by several rectifications, and M. Pierre effected it by frequently repeated operations

conducted at the lowest possible temperature. But on a manufacturing scale this is impracticable, because the distillatory columns are heated strongly and for a long time, so as not to leave any alcohol in the residues: at most one-third of the product would be alcohol of good flavor, and that would be still far from pure.

At the commencement of the distillation the first runnings consist of alcohol having a bad flavor (*mauvais goût de tête*) due especially to aldehydes and alcohols; then the runnings become less impure (*moyen goût de tête*). Alcohol of good flavor is collected towards the middle of the operation, and the remainder constitutes the last runnings (*moyen goût de queue* and *mauvais goût de queue*), which contain the higher alcohols and empyreumatic oils.

Attempts have been made to purify the alcohol by means of wood and animal charcoal, but with very imperfect results. Oxidation, both by treatment with various oxidizing bodies, and by the action of a current of air has also been tried, but with indifferent success, in consequence of the loss of alcohol. Considering the fact that the most active and odorous of the contaminating compounds are aldehydes,—vinic, butylic, amylic, etc.,—M. Naudin conceived the idea of getting rid of them by a process of hydrogenation, and this he has carried out practically by means of the copper-zinc couple.

If a plate of zinc be immersed in a solution of a salt of copper it becomes covered with a metallic deposit, and eventually constiutes a true copper-zinc couple, in which the copper exists in a finely divided state. Thus prepared the couple is capable of decomposing pure water, with evolution of hydrogen and formation of hydrate of zinc. It can consequently act freely in neutral liquids, and constitutes a powerful agent of hydrogenation. If an alcoholic distillate indicating 40 to 65 alcohometric degrees be brought into contact with such a couple in action it is found that the hydrogen evolved is absorbed and that the odor and taste of the distillate disappear rather rapidly. The distillates of maize and beet molasses thus hydrogenated, when rectified in the ordinary apparatus, show an augmentation of 25 to 30 per cent. of good flavored alcohol over the old yields.

In the apparatus of M. Naudin zinc cuttings are placed in successive beds of 15 to 20 centimeters in thickness, supported on wooden diaphragms pierced with holes in a vat made of wood, copper, or iron. At the commencement of the operation a sufficient quantity of 5 per cent. solution of sulphate of copper is run into the vat. The decolora-

ration of the cupric solution marks the completion of the precipitation of the copper in a pulverulent state upon the zinc cuttings, and the couple is then ready for work. The resulting solution of sulphate of zinc is run off, and the vat is filled with the distillate to be purified.

By a special arrangement, the alcohol is kept circulating in the vat, but the time required for it to remain in contact with the couple is not always the same. This necessarily depends upon the degree of contamination in the product to be purified, the temperature at which the hydrogenation takes place, and the condition of the couple. Temperature, especially, has a considerable influence upon the rapidity of the reaction; for instance, a sheet of zinc covered with precipitated copper gave in one hour at 2·2°C. 1·2 cc. of hydrogen, and at 98°C. in the same time 528 cc. The temperature of the liquor in the vat is controlled by a worm through which hot water or steam can be passed. When the hydrogenation is completed, the distillate is passed on to the rectifying column.

The hydrogenating action of metallic couples is generally sufficient for the entire purification of the distillate, and in the case of distillates from grain and beet molasses, the increase in the yield of good flavored alcohol in the first runnings is 25 to 30 per cent.

But this treatment, although sufficient for many distillates, does not sufficiently improve those obtained directly from beet, and in these cases M. Naudin completes the action by electrolysis by means of electric machines. The distillate from the beet is first left in contact with the copper-zinc couple a sufficient time (two days or more) to ensure its complete hydrogenation and then, nearly purified, but having still a slight flavor of its origin, it is acidulated by means of sulphuric acid and sent into a special arrangement of voltameters. The number of voltameters coupled varies with the intensity of the action required, and the quantity of distillate to be purified. In practice, in a factory running 6,000 or 7,000 gallons daily, twelve voltameters are in couple, and the electrolytic action is regulated by disconnecting or placing in circuit the required number. It is evident that in this operation there must be some oxidizing action, and to this extent it would appear to be open to the same objection as the processes based upon oxidation.

M. Pictet has recently announced that he effects the purification of alcohol by rectification carried on at a low temperature, and that this operation is carried on in a large scale in Paris. The distillates, or

even the musts, are placed in a large boiler surmounted by a rectification column, above which rises a condenser surrounded with cold water, which condenses the less volatile products so that they run back into the boiler. The vapor not condensed here passes into a refrigerator, surrounded with cold water, where they are completely condensed. The first runnings (*goûts de tête*) are collected in a receiver; next comes the good flavored alcohol, which is then run into a second boiler.

The first still is connected with an air pump, by which a more or less complete vacuum can be produced, and the temperature thus regulated. In the second still a nearly complete vacuum is produced, so that the temperature falls quickly. The vapor which issues from it consists of nearly pure nlcohol, because the few foreign bodies which pass into the first distillation do not give off vapor at the temperatures, varying between —10° and 5° which obtain in this part of the apparatus.

The vapor of alcohol thus purified rises into a second rectification column, terminated by a refrigerator cooled by liquid sulphurous anhydride, in which is maintained a temperatnre between —25° and —50°. The first portion is collected in a special vessel and withdrawn; the remainder is pure alcohol.—*Phar. Jour. and Trans.*, Aug. 5, 1882; from *Journal de Pharmacie*, 1882, v, 480.

Glyceroborates of calcium and sodium are recommended by Le Bon as antiseptics. They are prepared by heating together, with constant stirring, equal parts of borate of calcium or sodium and glycerin, until a drop removed and placed on a glass plate forms a brittle transparent pearl. Upon being poured out to cool the product forms a transrent glassy mass, soluble in alcohol and water, which, being very hygroscopic, is broken into fragments and kept in stoppered bottles. The glyceroborate of sodium is soluble in water in all proportions, and even in dilute solution is said to be a powerful antiseptic, though so non-irritating that a concentrated solution may be applied to the eye and other delicate organs without inconvenience. A simple coating of meat with a varnish of glyceroborate is said to be sufficient for its preservation. The similarity of these bodies to another recently referred to in these columns is obvious.—*Phar. Jour. and Trans.*, July 29. (*Compt. rend.*, xcv, 145).

SOLUBLE AND INSOLUBLE MODIFICATIONS OF THE GASTRIC FERMENT.

By A. Gautier.

Solution of pepsin from the sheep, filtered twice through paper, and then through biscuit porcelain, still retains the property of rapidly dissolving fibrin, and converting it completely into peptone. It has, however, only about half the digestive power of the unfiltered liquid. This soluble pepsin has also the property of fixing itself on fibrin in an insoluble form, as recently observed by Wurtz. The portion left on the filter, after prolonged washing, consists mainly of rounded or ovoid refractive corpuscles, about one-tenth or one-twelfth the diameter of the globules of beer yeast. They have a somewhat slow, non-brownian motion, and are frequently associated in pairs, in which condition they appear to be more mobile. They are accompanied by numerous agglomerations of brilliant immobile corpuscles, together with crystals of ammonium magnesium phosphate, fatty globules, and here and there very small bacteria: 0·086 gram of the dry insoluble matter was obtained from 4 grams of pepsin. This insoluble portion, in presence of dilute hydrochloric acid, has a power of dissolving fibrin six times greater than that of the unfiltered pepsin, but the process of digestion is not complete, even after a long time, the fibrin being converted into intermediate products, which are precipitated by nitric acid. The insoluble particles are probably protoplasmic granules from the peptogenic cells. The insoluble granules obtained from pepsin are gradually but slowly converted into the soluble modification in presence of pure water. This affords proof of Béchamp's supposition ("Compt. rend." 94, p. 582) that pepsin is a product of these gastric microzymas, as he terms the insoluble granules. The author is, however, unable to agree with Béchamp that these granules are living organisms which have the power of secreting pepsin. He regards them as a purely chemical ferment, without organization and without life, and bases this conclusion on the following facts. The granules show no signs of organized structure under the highest magnifying power; they do not propagate even under most favorable conditions; they digest albuminoids in presence of poisons which completely check the activity of organized ferments, especially such as are of the nature of vibrioles, and they act only in presence of free acids, whereas bacteria and their germs require a neutral or alkaline medium.

The insoluble granules can be easily obtained from the mucous membrane of a pig's stomach from which all mucus has been removed. Thus obtained their properties agree with those of the *gastric microzymas* of Béchamp.—*Jour. Chem. Soc.*, July, Aug., from *Compt. rend.*, vol. 94.

TWO ISOMERIC DIBROMOCAMPHORS AND MONOBROMOCAMPHOR.

By J. Kachler and F. V. Spitzer.

Monobromocamphor, discovered by Perkin in 1865, forms colorless monoclinic crystals, melts at 76°, boils without decomposition at 274°, and is reconverted into camphor by the action of alcoholic potash, or by heating it in alcoholic solution with sodium-amalgam. R. Schiff, by heating it with nitric acid, obtained a crystalline substance, $C_{10}H_{14}NO_3$, which he regarded as bromonitrocamphor.

By the further action of bromine monobromocamphor is converted into dibromocamphor, the statements respecting which by different authors exhibit considerable divergencies, due, as the following experiments will show, to the existence, not previously suspected, of two isomeric dibromocamphors (α and β).

α-Dibromocamphor is obtained by heating 1 mol. monobromocamphor with 1 mol. bromine in sealed tubes at 120°, and separates from the resulting syrupy liquid as a crystalline mass, which dissolves with moderate facility in alcohol, and is deposited therefrom in prismatic needles melting at 61°.

β-Dibromocamphor is obtained by heating monobromocamphor with bromine in the ratio of $C_{10}H_{15}BrO$ to 3Br for six or eight hours in sealed tubes at 120 to 125°, whereby a brown sprup is formed, which slowly deposits crystals, and when mixed with absolute alcohol, immediately yields a pulverulent crystalline mass, only slightly soluble in alcohol, even at the boiling heat, and separating from the solution in thick rectangular plates, having also the composition $C_{10}H_{14}Br_2O$, but melting at 114 to 115°. The mother-liquor contains monobromocamphor. The β-modification of dibromocamphor is also formed by heating the α-modification with 2 at. bromine in sealed tubes at 120 to 125° for six to eight hours. A red laminar sublimate then forms in the upper part of the tube, apparently consisting of an unstable compound of $C_{10}H_{14}Br_2O$ with bromine, which it gradually gives off,

leaving α-dibromocamphor (m. p. 61°). The greater part of the product, however, is a brown-red viscid liquid, which, when mixed with alcohol, immediately deposits a crystalline powder, having, after recrystallization from alcohol, the composition $C_{10}H_{14}Br_2O$, and melting at 114—115°, which is the characteristic melting point of β-dibromocamphor.

The differences between the two modifications of dibromocamphor are shown in the following table:

	α	β
Crystalline form	Rhombic: $a:b:c=$ 0·7925 : 1 : 0·5143. Observed faces, $\infty P \breve{\infty}$, $P \breve{\infty}$, $P \bar{\infty}$, ∞P.	Rhombic : $a:b:c=$ 0·9501 : 1 : 1·35206[2] Observed faces, ∞P, $P \breve{\infty}$, $\infty P \breve{\infty}$.
Solubility	Very soluble in alcohol, ether, ethylacetate, and light petroleum.	Sparingly soluble in alcohol, ether, ethyl acetate and light petroleum.
Alcoholic potash	Monobromocamphor, and finally camphor,	Oil smelling like turpentine, and distilling between 150° and 230°.
Nascent hydrogen from sodium-amalgam with dilute alcohol.	Monobromocamphor; finally camphor.	Hydroxycamphor, $C_{10}H_{15}(OH)$, boiling at 258—260°.
Nascent hydrogen from sodium-amalgam and ether saturatad with hydrochloric acid, in etheric solution.	Camphor.	Camphor.
Sodium and carbonic anhydride.	Camphocarboxylic acid, $C_{11}H_{16}O_3$,[1] melting at 123 to 124°.	Resinous masses.
Phosphorus pentachloride	No reaction	No reaction.
Fuming nitric acid	Nitrogen and a brominated oil.	Dibromononitrocamphor, $C_{10}H_{13}Br_2NO_3$, m. p. 126°.

—*Jour. Chem. Soc.*, Aug., 1882, p. 864; *Monatsh. Chem.*, iii.

[1]Misprinted in the original $C_{20}H_{32}O_6$.

[2]The figures given by Zepharovich is 0·5206. *Jour. Chem. Soc.*, 1882, p. 865.

DICHLOROCAMPHOR.

BY P. CAZENEUVE AND DIDELOT.

Camphor is dissolved in absolute alcohol, and treated with a current of dry chlorine for several hours at 80 to 90°. Heat is developed and hydrochloric acid is given off in large quantity. The product is repeatedly treated with water, and heated then to remove chloral and hydrochloric acid. On cooling, it solidifies to a crystalline mass, which may be purified by crystallization from alcohol. The *dichlorocamphor*, $C_{10}H_{14}Cl_2O$, thus obtained forms large white oblique prisms, slightly soluble in cold, but very soluble in hot alcohol; soluble in ether, in the vapor of which it liquefies, but insoluble in water. It softens at 89°, and melts at 93°, at which temperature it gradually volatilizes without decomposition. Above 150° it blackens and decomposes with evolution of hydrochloric acid. On continued heating, the temperature rises to 263°, at which point it remains constant, and a colorless liquid distils over.

The formation of the dichlorocamphor is probably preceded by that of the monochloro-derivative. No higher derivative is obtained by the prolonged action of chlorine at the temperature of the experiment.

Dichlorocamphor is insoluble in water, but imparts to it its peculiar odor. When placed on the surface of water, it exhibits gyratory movements, similar to those of camphor. It is insoluble in cold, but readily soluble in hot alcohol, in chloroform, carbon bisulphide, and ether. The ethereal solution crystallizes with difficulty, and the ether appears to form a molecular combination with the dichlorocamphor. The latter, unlike camphor, is insoluble in acetic acid. It combines with aldehyde in aqueous solution, forming a liquid heavier than water, but does not liquefy when triturated with chloral hydrate. Its sp. gr. is 4·2; it melts at 96°, and solidifies at 95°, but remains soft and pasty below 70°. The monochloro-camphor described by Wheeler melts at 95° The rotatory power of dichlorocamphor for $[\alpha]_j = + 57{\cdot}3°$, and is constant in both alcohol and chloroform. Dichlorocamphor crystallizes well only from alcohol, in right rhombic prisms, with brachydiagonal domes, and with difficult cleavage in two directions parallel with the faces of the prism. When the crystals form rapidly, the faces of the prism are much elongated, and the crystals are long friable needles; when, on the other hand, they form very slowly, the prismatic faces are but little developed, and the crystals have an octohedral appearance.—*Jour. Chem. Soc.*, July, Aug., 1882, from *Compt. rend.*, vol. 94.

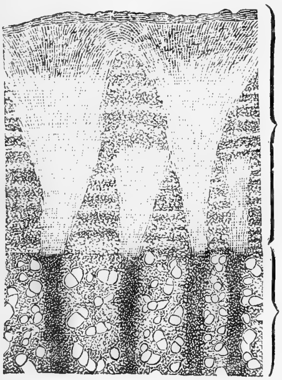
GLEANINGS IN MATERIA MEDICA.

By the Editor.

Mahonia aquifolia, De Cand., s. Berberis aquifolia, *Pursh.*—For description and use of this and allied plants and analysis of Berberis nervosa, consult this journal, 1878, pages 373, 374, 414 and 589. Dr. J. Moeller has submitted the root (stem ?) to microscopical examination with the following results :

The wood shows scarcely an indication of annual layers. The ducts are variable in size, rarely exceeding 0·1 mm., scattered, frequently several united tangentially, the terminal wall perforated, the lateral wall densely dotted and occasionally spirally striate ; the wood parenchyma is scanty.

The young bark has no sclerotic cells ; in older bark the parenchyma becomes thick-walled, forming layers resembling concentrically arranged bast layers ; but bast fibres are entirely absent, and the parenchyma is short, rarely forming more than three layers. The primary medullary rays are composed of 10 or 15 rows of cells and widen gradually to a layer of 1 mm., or more. Later on secondary medullary rays are formed singly in each bark ray and attain, centripetally, considerable width. The inner cell-groups of the medullary rays become sclerotic without changing size or shape. The middle bark consists of thin-walled, tangentially elongated parenchyma and is covered by delicately flat-celled cork.



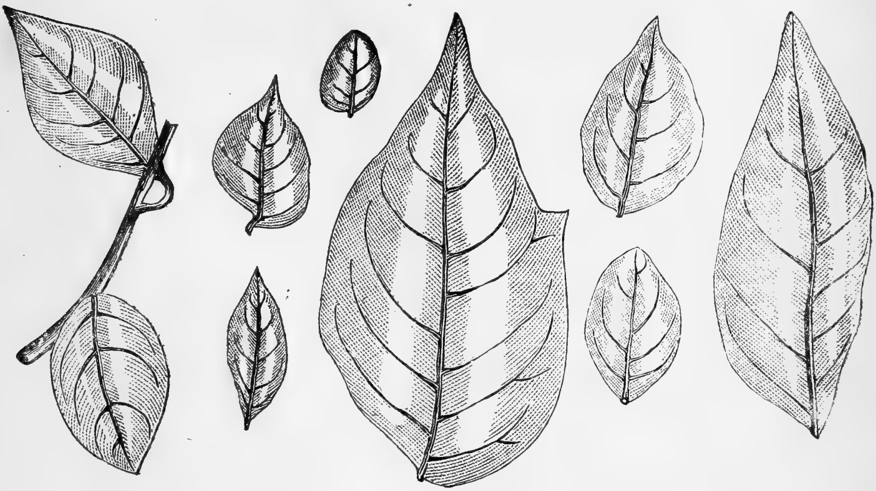
Mahonia aquifolia, transverse section ; *r* bark, *h* wood.

The parenchyma contains a golden yellow substance, soluble in water, while the sclerotic cells of the wood and bark retain the color. Berberine nitrate could not be obtained by Bödeker's microchemical reaction ; only traces of calcium oxalate are present and crystals are rarely observed ; but sulphuric acid causes the separation of a few needles of calcium sulphate. Starch is absent, indicating that the root is collected in summer.—*Phar. Centralhalle*, 1882, p. 356 and 357.

Veronica salicifolia and *V. parviflora* are known in New Zealand as "koromiko" and employed as a remedy for diarrhœa. The drug has been used by Dr. J. Jardine, of Kiukiang in China, who reports that cases of dysentery, which had varied in duration from six weeks to four

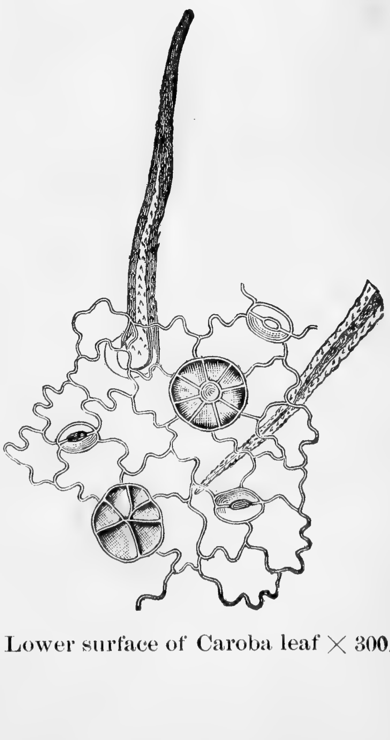
years, were cured by four or five doses of the drug.—*Phar. Jour. and Trans.*, July 29, p. 85.

Jacaranda procera, Sprengel.—The dry leaves, examined by Dr. J.



Different forms of the leaflets of Caroba, natural size.

Moeller, are of various shades of light green and brown, and variable in size and shape; but there are intermediate forms, agreeing in all other characters, which renders it probable that the drug is derived from one species only. They are assymetric, particularly near the base, are somewhat leathery, slightly revolute, the upper surface glossy, apparently smooth, the lower surface on the veins and near the margin velvety hairy; the petioles are occasionally short, and the secondary nerves anastomosing near the margin. The cuticle of the upper surface is thicker than upon the lower surface, the palissade layer is simple, the mesophyll rather dense. The epidermis consists of sinuate cells



Lower surface of Caroba leaf × 300.

with numerous stomata on the lower surface, and upon both surfaces with two kinds of hairs, either one-celled, conical, obtuse-pointed, rough, thick-walled and about 0·5 millimeter long, or short-stiped, flat, formed of 6 or 8 stellately arranged cells and containing an amber colored secretion.

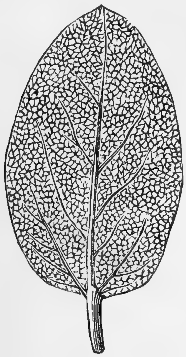
The drug is inodorous and has a bitter and astringent taste. It became first known in Germany in 1828, and about 15 years ago was recommended as blood-purifying, diuretic and antisyphilitic. Hesse (1880) found it to contain no alkaloid. For constituents, synonyms and allied plants consult this volume, page 135.—*Phar. Centralhalle*, 1822, p. 342—344.

Frankenia grandifolia, Cham. and Schl., s. Velezia latifolia, *Eschscholtz*, known as *yerba reuma*, grows near the seashore from San Francisco to San Diego and southward, and eastward in the desert of Arizona and S. Nevada. Dr. J. Moeller describes the drug as follows: Stem terete somewhat woody, little branched, about 15 centimeters (6 inches) high, leaves decussate, small, obtusely-ovate, or spatulate, the upper ones more linear, entire, one-nerved, fleshy. The young leaves and branch-tops are short-hairy, the older ones nearly smooth, sparcely hairy near the base and slightly ciliate. The branches terminate with a flower, which has frequently two lateral flowers upon short branchlets, and an involucre formed from the two last pairs of leaves. The calyx is tubular, angular, four-ribbed and four-toothed; the petals are pale reddish, clawed, small. The dry herb is gray-green, inodorous, of a saline taste, due to an incrustation of salt; after washing it is tasteless.—*Phar. Centralhalle*, 1882, No. 30.

Branch of Frankenia grandifolia (natural size).

Arctostaphylos glauca, Lind., Manzanita.—The leaves are elliptic or ovate, 25 to 40 millimeters long, 15 to 25 millimeters broad, short petiolate, mucronate, leathery, the margin slightly thickened, smooth, pale green, one-nerved, the secondary nerves not prominent and with marginal termination, both surfaces delicately and evenly netted-wrinkled, inodorous, astringent and bitter. Dr. J. Moeller describes the vascular bundles as being of an interesting structure, not roundish,

but linear on cross-section, the bast layers, however, not extending to the epidermis but ending with a stratum of collenchyma tissue, which spreads under the epidermis and often extends to the collenchyma of



Manzanita leaf (natural size).

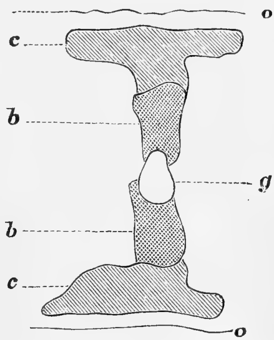


Diagram of transverse section of fibro-vascular bundle; *o* epidermis, *g* centre of bundle, *b* bast bundle, *c* collenchyme.

the adjoining vascular bundle. The parenchyma contains iron-bluing tannin. J. H. Flint obtained arbutin from the leaves (see "Amer. Jour. Phar.," 1873, p. 198).—*Phar. Centralhalle*, 1882, p. 355.

Analysis of several Plants from Uruguay.—Sacc has analyzed I, the leaves of Ficus elastica; II, the leaves of Laurus Camphora; III, a blue-flowering species of Vicia, and IV, Alsine media, the entire plant, with the following results:

	I.	II.	III.	IV.		I.	II.	III.	IV.
Caoutchouc,	·30	......	......	......	Wax,	·43	......	......	......
Gum,	......	·10	·80	......	Starch,	5·37	14·34	8·40	·79
Sugar,	1·10	5·50	17·00	......	Woodfibre,	17·00	21·60	23·60	2·05
Tannin,	1·00	......	......	......	Albumin,	......	......	......	·21
Fat and Camphor,	......	2·20	......	......	Dextrin,	......	......	......	1·91
Fat,	......	......	·40	......	Ash,	·27	3·00	6·20	2·00
Fibrin,	1·80	9·80	9·00	2·57	Water,	72·73	43·46	34·60	90·47
						100·00	100·00	100·00	100·00

—*Chem. Centralbl.*, 1882, No. 34; *Compt. rend.*, vol. 94.

PRACTICAL NOTES FROM VARIOUS SOURCES.

By the Editor.

Sulphophenate of Quinine.—Zinno states that he analyzed this salt in 1870 and that it was first prepared by Prota Giurleo; it contains 52 per cent. of quinine, 20 per cent. of sulphophenic acid and 28 per cent.

of water of crystallization. The salt is made by directly combining the alkaloid with sulphophenic acid, or by decomposing a solution of sulphophenate of lead (or of barium) by means of quinine sulphate. Since the salt is difficult to crystallize it is best dispensed in solution which should be accurately titrated.—*Annali di Chimica,* lxxiv, 282.

Preparation of Essence of Rennet from Fresh Stomachs. By Dr. J. Nessler.—In this paper the author communicates the results of some experiments made with the object of comparing the activity of essence of rennet made according to Soxhlet's method from dried stomachs ("Pharmaceutical Journal" [3], ix, 307) and that of essence made from fresh stomachs.

The experiment showed that, using corresponding quantities of dried and fresh stomach, the latter yielded the more active preparation. It was found, moreover, that the activity of the preparation from a fresh stomach could be increased by the removal of mucus, which not only made it more bulky, but prevented it from diffusing the milk so readily, and that this removal could be effected without injury by means of blotting paper. Preparations made from the top layer of the inside of the stomach, scraped off with a knife, proved much more active than others for which the residuum was used, but the residuum contained too much ferment to permit it to be left unused.

The author gives the following instructions for the preparation of an essence of rennet from fresh stomachs. Chop up a fresh calf's stomach as finely as possible, pour upon it two liters of water in which 100 grams of common salt has been dissolved, and shake well. After twelve hours add 200 cc. of 90° alcohol, and allow the whole to stand, with frequent stirring, in a closed flask for three weeks, then decant, and add sufficient blotting paper to cover it. After several weeks, during which the vessel must be kept well closed, the essence of rennet is drawn off into bottles and preserved. A liquor prepared in this way was, when fresh, capable of curdling 6,000 times its volume of milk, and, being kept in a well-corked bottle, it was found, after two years, to have diminished in activity only from 1 in 6,000 to 1 in 5,451.

The author adds that distilled or rain water gives a more active essence than spring water, and that it is advantageous to mince the stomach as finely as possible.—*Pharm. Journ. and Trans.,* Aug. 19, 1882; from *Pharmaceutische Zeitung.*

Estimation of Glycerin.—Glycerin mixed with volatile solvents is

often determined by heating at 100° to 110° until the residue ceases to lose more than 1 mgrm. per hour, while others mention that on heating for 8 to 10 hours at 100° to 110°, it is completely volatilized. (See "Amer. Jour. Phar.," 1877, p. 371; 1878, pp. 278, 377.

Couttolenc finds that glycerin is obtained in the anhydrous state when heated for five hours at 90°, but at this temperature a surface of one square centimeter is said to lose 3·17 mgrms. glycerin. According to Barbsche two drops of phenol in 8,000 to 10,000 parts of water gives a distinct blue coloration with one drop of a solution of ferric chloride, which is destroyed by the addition of 6 to 8 drops of glycerin. This reaction is recommended for detecting glycerin in wine and beer.

It is shown that the same reaction is obtained with sugar, gum arabic, etc., hence its application for detecting glycerin in wine and beer is not practicable.—*Jour. Chem. Soc.*, August, 1882; from *Dingl. polyt. J.*

Contributions to the Chemistry of Bile. By G. Hüfner.—The remarkable behavior of the galls of Tübingen cattle with ether and hydrochloric acid has already been noticed by the author. It was thought that a study of the relative quantities of glycocholic and taurocholic acids in different samples of bile would explain why some crystallized at once on addition of ether and hydrochloric acid, and other kinds refused to do so. To this end, ten samples of bile were analyzed, six of which gave a rapid crystallization of glycocholic acid, one a weak one, and three none at all; it was found that the quantities of taurocholic and glycocholic acids respectively were as one to five in the samples from which the latter acid crystallized rapidly, and about equal in those where no crystallization at all occured. That this result had nothing to do with the question as to the absolute increase or decrease in quantity of each acid in the bile was shown by the fact that dilution in the one case did not put a stop to crystallization, whilst in the other concentration did not induce it.

Again, experiments with mixtures of the pure salts of taurocholic and glycocholic acids showed that the relative proportion of the two acids present in solution together had very little, if any effect on the crystallization of the latter. Hence those biles in which there is no appearance of crystallization of glycocholic acid on addition of ether and hydrochloric acid, must contain some other body, the presence of which is possibly dependent on the nature of the animal's diet, and which prevents the crystallization of glycocholic acid under those conditions.—*Jour. Chem. Soc.*, August, 1882; from *J. pr. Chem.*

VARIETIES.

Collodium for Corns.—1. *Gezow's:* Salicylic acid, 3·0; collodium, 24·0; extract of cannabis indica, 0·5 gm. Dissolve.

2. *Wit-Tshaikowski's:* Salicylic acid, 5·0; collodium, 30·0; turpentine, 3·0 gm.—*Hager's Praxis, Supplement.*

Apomorphia as an Expectorant.—We read in "le Journal Thérapeutique" that Dr. Beck used apomorphia as an expectorant in sixty-three cases of bronchial catarrh, and in thirty-one of broncho-pneumonia. The bronchial secretion becomes more fluid and the thick secretion common particularly in broncho-pneumonia is ejected with more facility. The prescription for an adult is as follows:

℞	Apomorph. chlorhydrat., ...	gr. $\frac{3}{4}$
	Ac. chlorhydric. dil., ...	♏xv
	Syr. simplicis, ...	℥i
	Aquæ, ...	℥iv. M.

The dose is a tablespoonful every two, three or four hours. A teaspoonful would be the proper dose for children of from three to ten years of age. —*Med. and Surg. Rep.*, August 12.

Chloralated Tincture of Iodine.—Carlo Pavesi gives the following formula: Iodine, 20; chloral hydrate, 30; alcohol of 36°, (sp. gr. ·958?) 140 parts. The solution takes place without decomposition and the preparation is miscible with water without precipitating. It is of a pure golden hue, has the odor and taste of its ingredients, coagulates albumen readily and is an excellent hemostatic and very useful in the treatment of large wounds as an antiseptic and hypnotic.—Io. Spallanzani.—*Medical Record.*

Benzol Inhalations in Whooping Cough.—An anonymous writer sends a short communication to the "London Lancet" on this subject. As a substitute for the inhalation on gases, which are thrown off in the neighborhood of gas works, he caused his patients to inhale the vapor of benzol, which he diffused through the air of the room by means of a spray apparatus, such as is used by Lister "with the most gratifying results. It certainly checked the spasm and relieved the whoop."—*The Cincinnati Lancet and Clinic.*

THIRTIETH ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

First Session—Tuesday, September 12th.

The sessions of the Association were held in the Cataract House, at Niagara Falls, one of the spacious halls having been fitted up for the occasion. The acoustic properties of the meeting room were better than at several previous meetings, but were by no means as perfect as might have been desired for such a large assemblage. Over 200 members were in attendance, but the exact number is as yet unknown, many of the members hav-

ing been prevented from registering in consequence of not finding the register upon the table assigned for it.

Shortly after the appointed hour President Bedford called the meeting to order, and appointed Messrs. E. Lilly of Indianapolis, P. C. Candidus of Mobile and A. W. Miller of Philadelphia a committee to examine credentials. The Local Secretary, Mr. H. E. Griffith, was introduced to the meeting, and, referring to the numerous beauties and magnificent sceneries of this attractive spot, extended a hearty welcome to the visitors.

The President delivered his annual address, in which he referred to the history of this Association, to the rapid increase of local and State pharmaceutical associations, to the enactment of pharmacy laws, to the forthcoming new Pharmacopœia, and to various other matters of interest and importance to pharmacy in general and to the Association in particular. The address was well received, and, on motion of Dr. Menninger, received the thanks of the Association, and was referred to a committee consisting of ex-Presidents Gordon, Markoe and Bullock for consideration and report upon the suggestions.

The Council reported the names of 77 applicants for membership, after which the various committee reports were read by title. The Committee on Credentials reported that delegates had been accredited from the Colleges of Pharmacy of Chicago, Cincinnati, Louisville, Maryland, Massachusetts, National (Washington), New York, Ontario, Philadelphia, Pittsburgh and St. Louis; from the State Pharmaceutical Associations of Alabama, Connecticut, Georgia, Indiana, Iowa, Kansas, Kentucky, Massachusetts, Missouri, New Hampshire, New Jersey, New York, North Carolina, Nova Scotia, Ohio, Pennsylvania, Rhode Island, South Carolina, Virginia, West Virginia and Wisconsin; from the Local Associations of Albany County, N. Y., Cleveland, O., Erie County, N. Y., German Apothecaries of New York, Indianapolis, Kings County, N. Y., Lancaster County, Pa., Mobile County, Ala., Monroe County, N. Y., Newark, N. J., Richmond, Va., and Toledo, O.; and from the Alumni Associations of the Chicago, Louisville, Massachusetts, New York, Philadelphia and St. Louis Colleges of Pharmacy. The credentials of the delegates of the Western Wholesale Drug Association were referred back to the meeting, the committee not being able to satisfy themselves that the Association was entitled to delegates under the by-laws.

A motion made for the recognition as delegates of two members of the Kings County Pharmaceutical Society, the entire delegation being absent, was, after some opposition, withdrawn. The committee of the Western Wholesale Drug Association were then invited to take seats and participate in the discussion on pharmaceutical subjects that may come before the meeting; and the representatives of the pharmaceutical bodies named above were received as delegates. Mr. Richardson, of St. Louis, as the chairman of the committee named before, addressed the meeting, stating that the association he represented had virtually become a national association, and that, though working in different paths, the field of labor of the wholesale drug and pharmaceutical associations was very similar; he offered congratulations and sympathy in the persistent labors and high aims, and hoped

that a similar committee from the pharmaceutical association would meet, in a spirit of fraternal good will, the Wholesale Drug Association at its meeting in Cleveland in November next.

The Committee on Legislation presented a lengthy report, with copies of laws affecting pharmacy and pharmacists. During the past year pharmacy laws were enacted in Georgia and Wisconsin; amendments to the pharmacy laws in Connecticut, Iowa and West Virginia; laws against the adulteration of food and drugs in Louisiana and Massachusetts, and laws affecting pharmacists in the use of liquor for medicinal purposes in Connecticut and Iowa. Through correspondents, there were also obtained older laws on pharmaceutical matters, which had not been previously published by the Association, from the States of Alabama, Colorado, Indiana, Kentucky, Minnesota, Tennessee and Texas.

The Nominating Committee was appointed in the usual manner, each delegation naming one member, and in addition thereto the President appointed Messrs. J. A. Lee, of New Iberia, La.; J. F. Llewellyn, of Mexico, Mo.; T. W. Shryer, of Cumberland, Md.; W. S. Robinson, of Yorkville, Ont., and C. M. Driggs, of White Haven, Pa.

A Committee on Exhibits was appointed by the President, consisting of Messrs. Wm. B. Thompson, of Philadelphia; Theo. Schumann, of Atlanta; J. W. Caldwell, of Detroit; T. J. Casper, of Springfield, O., and George Eger, of Cincinnati; after which the Association adjourned until Wednesday morning.

Second Session—Wednesday, September, 13th.

After the reading and approval of the minutes of the first session, the Nominating Committee presented a report, recommending the election of the following officers and Standing Committees for the ensuing year:

President, Charles A. Heinitsh, of Lancaster, Pa. Vice-Presidents—Jno. Ingalls, of Macon, Ga.; Louis Dohme, of Baltimore, Md.; Wm. B. Blanding, of Providence, R. I. Treasurer, Charles A. Tufts, of Dover, N. H. Permanent Secretary, John M. Maisch, of Philadelphia, Pa. Reporter on Progress of Pharmacy, C. Lewis Diehl, of Louisville, Ky. Members of the Council—S. A. D. Sheppard, of Boston, Mass.; Wm. Saunders, of London, Ont.; Wm. S. Thompson, of Washington, D. C.; Committee on Drug Market—Geo. W. Sloan, of Indianapolis, Ind.; Jas. G. Steele, of San Francisco, Cal.; W. H. Wickham, of New York; I. L. Lyons, of New Orleans, J. P. Muth, of Baltimore, Md. Committee on Prize Essays—C. Lewis Diehl, of Louisville, Ky.; John F. Judge, of Cincinnati, O.; Emil Scheffer, of Louisville, Ky. Committee on Legislation—John M. Maisch, of Pbiladelphia, Pa.; Samuel A. D. Sheppard, of Boston, Mass.; Chas. Mohr, of Mobile, Ala. Committee on Papers and Queries—J. U. Lloyd, of Cincinnati, O.; A. Mayell, of Cleveland, O.; W. W. Bartlett, of Boston, Mass.

All the nominees were duly elected, and the new President and two of the Vice-Presidents were introduced to the meeting, and on assuming the duties of their offices made brief addresses returning thanks; the second Vice-President elect was not present at the meeting.

The delegation of the Illinois Pharmaceutical Association presented credentials and was admitted. Invitations for holding the next Annual Meeting were received from San Francisco, New Orleans, Atlantic City, Cincinnati, and Washington, and a committee of five was appointed to report thereon.

The Secretary of the Council read the minutes of the six sessions held by that body since last year. These minutes inform of the election of Dr. Charles Rice as the second member for the United States of the International Pharmacopœia Commission; a plan for using the income from the Centennial Fund had been adopted; the traveling arrangements to and from the annual meeting had been referred to the Entertainment Committee; a plan for the general management of the financial affairs of the Association by the Treasurer, under the supervision of the Finance Committee, had been perfected; the accounts of the Treasurer had been audited, showing a cash balance in his hands amounting to $1,981.10; the Ebert fund, the Centennial fund and the life-membership fund are separately invested in U. S. 4 per cent. registered government bonds. The Committee on Membership reported the roll to contain 20 honorary and 1,286 active members; ten of the latter had died since last year.

The various committee reports were read and referred, and the reading of papers was then proceeded with.

On thymol from oil of thyme was the subject of a paper read by Mr. Jos. L. Lemberger, who purchased nine separate lots of the oil, one of which was known to have been distilled from Thymus vulgaris in this country. By treatment with soda four of the oils yielded less than 1 per cent., the remaining samples, all of which had a red color, 1·67, 6·67, 7·92, 16·67 and 38·75 per cent. of crude thymol; from the American oil, which was white, ·84 per cent. was obtained.

Considerable discussion took place on this subject, in which the properties of commercial thymol, its antiseptic value, its chemical nature as an alcohol and phenol, its yield and its occurrence in other volatile oils was alluded to. In regard to the latter, Prof. Maisch stated that thymol could be obtained in considerable quantity from the volatile oil of an American plant, Monarda punctata, from which it frequently crystallized on standing. The yield of volatile oils and the relative proportion of their proximate constituents were not constant, but were subject to the nature of the soil, the climate and atmospheric influences generally; the volatile oils distilled from thyme raised in different localities must therefore be expected to vary in the amount of thymol. Since the oil consisted also in part of hydrocarbons, which have a lower boiling point, it was natural to expect oil of thyme distilled from the fresh herb to contain relatively less thymol than such which had been obtained from the dry herb, which would yield a smaller percentage of volatile oil, containing, however, most likely, a larger percentage of thymol.

Mr. G. W. Kennedy read a paper on *Commercial Mercurial Ointment*, giving the assays of 15 samples. The mercury was determined by removing the fat by means of ether, also by Thein's method ("Amer. Jour. Phar.," 1882, p. 309); 12 samples from retail stores yielded from 21·5 to 40,

and only one 50 per cent. of mercury, while 3 samples obtained at wholesale gave 41·75, 46 and 48 per cent.

In the discussion attention was drawn to the facts that, as prepared on a large scale, when mercurial ointment is filled while warm, as is often the case, a certain amount of variation must be expected in the contents of the first and last jars; that ointment kept in a warm place will contain different amounts of mercury in the upper and lower layers, and that it is customary in many places to dispense the officinal ointment only upon prescriptions, while for the ordinary retail trade a weaker ointment is sold. That in cases of sharp competition, this article is occasionally adulterated had been observed by Dr. Menninger, who had met with an ointment containing only a very small amount of mercury, the deficiency in color being concealed by the admixture of powdered charcoal. It was also stated that at wholesale two kinds of mercurial ointment are kept, one containing ½, the other ⅓ mercury, the difference being, as a rule, indicated upon the label.

A paper by Prof. Emlen Painter on *the preparation of mecurial ointment* was read, giving a process by which one person can easily prepare from 40 to 50 lbs. a day. Four pounds of mercury and four ounces of mustard-seed oil, or other limpid fixed oil, are stirred together with a spatula in a flat iron dish, until uniformly divided into small globules, for which five minutes or less is required; next, four ounces of tallow, or of a mixture of tallow and lard, is added, cold, and rubbed together until uniformly mixed. The granular mixture is then transferred to a marble slab, two feet square, and rubbed with a spatula loosely at first, afterwards with more pressure, a little tincture of benzoin being added, until the globules of mercury are no longer visible, when it is returned to the iron dish, stirred together with eight ounces of oil and then with a mixture of equal parts of tallow and lard, melted together and cooled to about 170°F., when merely continuous stirring will be required until the whole stiffens. The ointment is now again transferred to the slab and rubbed in divided portions to insure uniform mixture.

In the remarks following the reading of this paper it was stated that Professor Remington's process ("Amer. Jour. Phar.," 1881, p. 192) which had been adopted in the new pharmacopœia, appeared to be more expeditious and less troublesome.

Mr. P. C. Candidus read a paper on *the solubility of chemicals in alcohol*, both at 155°C. (60°F.) and at the boiling point. The correctness of the results more particularly of those obtained at the elevated temperature, was questioned, because during the heating which was conducted in a test tube loosely stoppered, strong alcohol was most likely evaporated, leaving a more aqueous liquid behind; the results with alum (1 in 5), burnt alum (1 in 6), potassium chlorate (1 in 8·5) and others seem to prove the corectness of the objection.

After paying a visit to the exhibition room the Association adjourned until Thursday morning.

THIRD SESSION—THURSDAY, SEPTEMBER 14TH.

The minutes of the second session having been read and approved, those

of the Council were read and likewise endorsed, the latter giving information of the election of 111 new members, and of the recommendation of the following gentlemen for honorary membership: Thos. Greenish of London, Peter Squire of London, Jos. Ince of London, Geo. F. Schacht of Clifton, Bristol, and Rich. Reynolds of Leeds, England; Christian Brunnengraeber of Rostock and Carl Schacht of Berlin, Germany; F. von Martensen of St. Petersburg, Russia; Nicholas Sinimberghi of Rome, Italy; Michael Carteighe and G. W. Sandford of London.

Credentials from the Pharmaceutical Association of Quebec were received and the delegates admitted.

The committee on the time and place of the next annual meeting recommended that it be held in Washington, D. C., on the first Tuesday of September, 1883; they likewise recommended that hereafter the Entertainment Committee name two or more places for holding the next meeting, and that the Secretary be instructed to acknowledge the invitations received from Atlantic City, San Francisco and New Orleans. The recommendations were adopted, but the time was afterwards changed to the second Tuesday of September.

Amendments to the by-laws previously proposed were acted upon and adopted; these require the Council to examine the credentials of delegates previous to the first session, the credentials to be sent to the Permanent Secretary at least two weeks in advance of the annual meeting, and the publication, in the Proceedings, of a synopsis of the Council sessions.

Mr. Sheppard spoke warmly in favor of holding a meeting in San Francisco during the next three years. Several members who participated in the discussion acknowledged the desirability of meeting on the Pacific coast, but regarded the length of time the attending members from the East would necessarily have to be absent from home, and the expense of the journey as serious obstacles. However, a committee consisting of Messrs. S. A. D. Sheppard of Boston, T. Roberts Baker of Richmond, Va., and J. S. Evans of West Chester, Pa., was appointed, to consider this matter in all its relations and report at the next annual meeting.

The motion to appoint a committee of five to attend the next meeting of the Western Wholesale Druggists' Association at Cleveland, and express the sympathy and interest of the Pharmaceutical Association in their organization, created some discussion, resulting in the adoption of the resolution and the appointment of Messrs. W. J. M. Gordon of Cincinnati, Chas. Bullock of Philadelphia, Wm. Saunders af London, E. H. Sargent of Chicago, and E. Shallentrager of Cleveland.

On Caffeine in Guarana.—Mr. J. H. Feemster read a paper on this subject. The author first examined a select example of seeds which proved to contain 5·08 per cent. of caffeine. Five samples of guarana yielded 3·9, 4·2, 4·2, 4·3 and 5·0 per cent., or an average of 4·32 per cent. of the alkaloid. The process employed was that of Prof. Wayne, described in the "Amer. Jour. Phar.," 1875, p. 135, and 1877, p. 337, the guarana being mixed with an excess of litharge and boiled with water until the insoluble matter settles rapidly, which requires about three hours, while the same change takes place with the seeds in less than one hour. The cause of this difference in behavior has not been ascertained; it was, however, observed that

the addition of a few drops of subacetate of lead at the time when the color of the solution begins to disappear apparently facilitates the disposition of the insoluble matter, leaving the liquid more free from coloring matter and causing the caffeine to separate in crystals so white that recrystallization is unnecessary.

For the purpose of determining the most suitable menstruum for preparing a *fluid extract of guarana* the drug was exhausted with mixtures containing in the pint four fluidounces of glycerin and from 3 to 8 fluidounces of alcohol. The guarana exhausted by percolation—$2\frac{3}{4}$ pints of percolate being obtained from 16 troyounces of the drug—still contained about one per cent. of caffeine, and the fluid extracts obtained after several months commenced to deposit chocolate-colored precipitates, enclosing groups of crystals of caffeine; these precipitates, however, decreased with the increased alcoholic strength and did not form in the fluid extract made with a menstruum of one-half alcohol and one-fourth glycerin, while diluted alcohol without glycerin did not prevent the deposition.

Mr. Cowdrey read a paper *on commercial extracts of malt* and demonstrated the rapid liquefaction of warm starch paste by means of Trommer's extract of malt, proving that it contains a considerable amount of diastase. Professors Diehl and Maisch objected to the reception of this paper under the belief that the name of the preparation was copyrighted and the process a secret one; but assurance was given that such was not the case, and the author was requested to embody in his paper the process by which the preparation is made and which is based upon the well-known fact that diastase, while destroyed at a boiling temperature, is not altered by a heat of 75°C. (167°F.). When malt is boiled with water or the infusion of malt is evaporated at or near the boiling point, the resulting extract contains no diastase.

Prof. Prescott directed attention to the importance of testing extract of malt for its power of converting starch into dextrin, and alluded to some of of the precautions necessary in the application of this test.

In connection with the questions raised by this discussion Mr. Cowdrey inquired in regard to the position of the American Pharmaceutical Association towards *copyrighted preparations* and *secret processes*. Dr. Menninger thought that as yet the Association had not expressed itself on these points; but Prof. Maisch showed from the records that the Association from its very organization had taken a decided stand against such practices. In 1852, when copyrighted pharmaceutical and chemical preparations were unknown, the Association in its Code of Ethics, Art. I, discountenanced quackery and dishonorable competition in business, and in Art. VII declared it to be the duty of every apothecary and druggist to publish the new ideas and phenomena that may occur in the course of his business. In 1853 a resolution was passed urging the discouraging, by every honorable means, of the use of nostrums, and the abstaining from manufacturing any medicine the composition of which is not made public. In 1854 the report of a committee on quack medicines was approved, reaffirming these sentiments. In 1856 the Constitution was altered and Sections 1 to 5, of Art. I, adopted substantially as they are at present, the 5th section declaring one of the

objects of the Association to be the suppression of empiricism. In 1870 Sections 6 and 7 were added, the latter declaring in favor of creating and maintaining a standard of professional honesty equal to the amount of our professional knowledge. The Code of Ethics not having been published for a number of years, the Association, in 1868, had the matter investigated by a committee and then declared that it had been superseded by and embodied in Article I of the Constitution. Since 1857 exhibitions have been had at the time of the annual meetings, and though the by-laws were silent on this subject, it was well understood that secret and patented medicines should not be exhibited, and if perchance they should have eluded the vigilance, that they should not be reported on. Notwithstanding this, objectionable articles had crept in, so that in 1877 a motion for abolishing the exhibitions was made and referred to a committee, which reported a set of rules that were adopted, and have also become the guide for a number of the State Pharmaceutical Associations. These rules absolutely exclude from the exhibitions all proprietary and patented medicines, medicinal or pharmaceutical preparations the names of which have been copyrighted or the complete working formula of which is withheld and such chemical preparations or mixtures which are offered under other than their proper scientifically recognized names. Many preparations, which are prescribed by physicians and recommended by professors in medical colleges in different parts of the United States, cannot be admitted to these exhibitions, and while it is not required that the preparations on exhibition shall have a label giving the working processes, still every member has the right to ask for the same, and if refused, such preparations would be excluded.

On account of the position taken by the Association in this question no action was deemed necessary upon a communication from the Pennsylvania Pharmaceutical Association, protesting against the injustice of allowing the copyrighting of common pharmaceutical names; it was ordered to be spread upon the minutes.

A resolution declaring in favor of quinine free of duty was promptly tabled.

Professor William B. Carpenter of London, England, was introduced to the Association and cordially received. In thanking the Association for this reception, he offered his congratulations on the progress of pharmacy on this continent and referred to the advance made in science generally and more especially in microscopy.

The report of the Committee on the President's Address was read. The recommendation for placing the sum of $200 at the disposal of the Council for defraying such expenses as may be incident to their duties was carried. The Entertainment Committee was retained as a special committee and three additional members added to it. In regard to the proposed change of time for the installation of the officers the majority report, recommending that no change be made, was adopted by a vote of 41 ayes against 10 nays.

On motion of Mr. Sheppard the sum of $100 was voted to the Secretary of the Council for services rendered during the past year.

Mr. Rosenwasser commenced the reading of a paper entitled *a study of*

percolation, which, owing to its extreme length, was referred for publication. The author reviewed the theory of percolation, discussed the various methods proposed for percolating under pressure and pointed out what he considers the advantages of the apparatus constructed by him, in which the vegetable powder is confined in a limited space so as to permit of no expansion (see "Amer. Jour. Phar.," 1881, p. 569).

A paper on *gentiopicrin* by Prof. E. L. Patch was read, detailing his experiments for obtaining this principle in the crystalline state from the dry root, in which he was unsuccessful, thus corroborating Kromayer's observations.

Prof. Bedford read a paper on *commercial creasote* and the different reactions of phenol and wood creasote. In the discussion attention was directed to the fact that creasote is a mixture of different compounds and that its composition and behavior must necessarily vary to some extent if obtained from different kinds of wood.

Professor Bedford also read a paper *on commercial bismuth and bismuth salts.* The subnitrate and subcarbonate of bismuth obtained from six manufacturers merely contained traces of alkaline earths, two samples also traces of ammonia, while all contained arsenic, the amount varying from ·04 to ·3 per cent. A specimen of Australian bismuth contained traces of copper and arsenic.

An interesting paper giving the results of numerous experiments *on the germination of seeds of medicinal plants* was read by Mr. Wm. Saunders. The many failures with seeds which did not germinate were attributed to the fact of the seeds being old and dry.

Fluid extract of Hydrastis canadensis was the title of a paper by Mr. Chas. Spenzer of Cleveland, O., which gave the methods employed for assaying nine samples of the commercial fluid extract. The results are tabulated thus:

Specific gravity of Fluid Extract	Specific gravity of Diluted distillate	Physical appearance of fluid extract.	Solid Extract	Alcohol per ct.	Glucose and Cane sugar.
1·056	·940	Clear dark brown.	231 gr.	39	none.
·9715	·935	Clear red-brown.	125½ "	42	small amount.
1·1645	1·010	Clear brown-yellow.	185½ "	none.	large amount.
·9725	·960	Clear brown-yellow.	100 "	29	none.
1·047	·940	Dark brown; fine sediment.	211½ "	39	"
·9545	·935	Dark brown; granular sediment.	154½ "	42	small amount.
·996	·945	Clear dark-brown.	210½ "	37	large amount.
1·0485	·940	Clear red-brown.	215 "	39	none.
·973	·930	Red-brown; granular sediment.	218 "	44	none.

An adjournment was had until Friday morning.

FOURTH SESSION—FRIDAY MORNING, SEPTEMBER 15TH.

The minutes of the previous session and of the Council having been read and approved, a motion that the Entertainment Committee be requested hereafter to provide no banquet, was carried, but reconsidered at the request of the chairman of that committee, and after some allusion to the uncivil treatment at the Cataract House withdrawn.

A paper by Prof. W. T. Wenzell of San Francisco *on phosphoric acid* was read, in which the author advocates the revival of the old process of the slow oxidation of the phosphorus by moist air. An ordinary infusion jar was found convenient for this purpose, the stick phosphorus being placed

upon the diaphragm, sufficient water poured in to partially immerse the sticks, and the top covered with a porous disk of plaster of Paris. Larger quantities of phosphorus may be oxidized by using a tray, one three inches in depth with a surface of 9 by 5 inches admitting of the oxidation of 8 ozs of phosphorus, which is placed upon a grating resting upon a narrow shelf at the height of about 1½ inch from the bottom; the tray is covered with a porous tile and the acid liquid drained off and at the end of the process withdrawn through a movable bent tube inserted near the bottom of the tray and adjusted so as to reach to the height of the grating. The apparatus should be made of well-glazed pottery, possibly gutta percha may answer; but if made of lead, a portion of that metal will be dissolved. The products of this moist aerial oxidation are ozone, hydrogen peroxide, ammonium nitrate, phosphorous and phosphoric acids, of which, with proper management, the latter is produced in by far the largest quantity. On concentrating the liquid, arsenic, if present, will separate completely in the metallic state when the temperature reaches 160°C. (320°F.), the reduction being effected by the phosphorous acid, which at a higher temperature would be decomposed into phosphoric acid and spontaneously inflammable hydrogen phosphide. After the deposition of the arsenic the liquid is diluted, filtered and oxidized by nitric acid, of which, for 360 grains of phosphorus, only from two to five drachms are necessary, against five troy-ounces required by the officinal process. By thus oxidizing about nine-tenths of the liquid any excess of nitric acid may be removed on the addition of the reserved portion, and the quantity may be still lessened by conducting this operation in a large flask, holding from 8 to 10 times the volume of the acid liquid, when but a very small quantity of nitrous fumes will escape and the nitric peroxide will be utilized in the oxidation.

In the discussion on this paper it was stated that the product of oxidation of phosphorus in moist air was formerly known as *phosphatic acid*, and contained phosphorous and phosphoric acids in variable proportions, the former being almost exclusively present in the beginning and as long as unoxidized phosphorus was found in the apparatus in some quantity. Professor Markoe spoke of certain precautions in the process for oxidizing phosphorus, without heat, by nitric acid in the presence of iodine and bromine, and Prof. Lloyd referred to modifications of the officinal process with hot nitric acid.

Mr. C. B. Allaire read an interesting paper *on the purity of powdered drugs*, giving merely the results of investigations. Of 416 samples of powdered drugs, sold in bulk, 189 or about 46 per cent. were sufficiently adulterated that detection was easy. Golden seal was found mixed with starchy matter, fringe tree bark and wahoo bark with the wood of the root, liquorice with corn starch and sugar, ipecac with starch and with American ipecac (Euphorbia Ipecacuanha?) etc. The writer stated, very properly, that the remedy was not solely in legislation, nor in education combined with indifference, but in education combined with vigilance, and it should have been added, with personal integrity. It was stated that there are parties engaged in preparing adulterants costing from 2 to 4 cents per pound,

and that they agree to match in color and appearance any powder that may be submitted.

Mr. Richardson, of St. Louis, stated that adulterations were due to the demand for low priced goods by the consumer and retailer, and to the tendency in the wholesale trade to sell goods at a figure representing the profits as nearly as may be by naught.

Prof. Maisch had no doubt of the prevalence of adulteration, but, looking at the condition of the drug market at the present time, and comparing it with that of 20 or 30 years ago, there was undoubtedly a vast improvement, and this matter was perhaps better, certainly not worse, than in most civilized countries. Formerly adulterated goods were openly manufactured in Europe, and inferior drugs sent here, as being good enough for America, while now the best articles were very generally selected, and considered none too good for this market. He also spoke of the difficulties connected with proximate analysis, and with the assaying of many drugs, and that the results, while they might be perfectly satisfactory to the investigator who may undertake the labor in good faith, yet would be unreliable or insufficient if measured by the standard of an expert.

Boracic acid, its preparation and uses, was the subject of a paper by Mr. Edmund Dana, Jr., of Portland, Me. The author found its preservative action mentioned only in the Proceedings for 1880, p. 229, but overlooked the notice in Proceedings, 1873, p. 269, and in "Am. Jour. Phar.," 1872, p. 353. The paper gives a condensed account of its chemical, physical and therapeutical properties, and gives formulas for a concentrated *liquor*, (boric acid grs. xviii, water f℥i), *glycerite* (boric acid ʒiii, glycerin f℥i, to be dissolved with the aid of a water-bath) and an *ointment*, the latter to be made by melting together white wax ℥ii and vaseline ℥xii and adding glycerite of boric acid ℥ii.

During the discussion on this paper a specimen of boroglyceride, prepared by Mr. Thomas E. McElhenie, was shown, and the irritating qualities occasionally observed on the use of boric acid were referred to as being probably due to adhering sulphuric or hydrochloric acid, which contamination could be avoided by recrystallization from water.

Mr. A. Conrath presented a paper on *the alcoholic strength of commercial fluid extracts*, giving the results of the examination of a number of these preparations.

A valuable paper by Prof. Lloyd, treating of *precipitates in fluid extracts*, was read. It was a continuation of one presented the previous year, in which it was shown that in such complex solutions as percolates each stratum, as it passes from the percolator, represents a liquid holding in solution certain substances soluble therein only through the intervention of other substances directly soluble in the simple menstruum, and that by the mixture of each succeeding stratum with those that preceded it the character of the liquid continually changes, even if the simple menstruum remains the same, so that substances may now become insoluble which in the preceding liquid were held in perfect solution. To establish the final equilibrium of a complete solution requires a certain length of time, but in the present paper the author shows that in such concentrated solutions as fluid

extracts this time may never arrive, inasmuch as solubility is also influenced by temperature, and by even slight changes of temperature different strata are produced, with different solvent powers, whereby substances previously precipitated or rendered insoluble in one stratum may be dissolved by another, thus again changing the nature of the liquid and of the different strata of this liquid as a solvent; every change in temperature will be followed by either decreased or increased solvent power, and consequently by more or less precipitation or re-solution of the precipitate.

On motion of Dr. Menninger, seconded by Messrs. Maisch and Kennedy, the following resolutions were passed:

Resolved, That this Association deems it of importance to the efficiency of the natonal military and naval organization, as well as due to the national reputation, that none but well-qualified persons, either graduates in pharmacy or licentiates in pharmacy, be employed as hospital stewards or apothecaries in the public service.

Resolved, That, in the opinion of this Association, such professional men should be raised to a rank commensurate to the qualifications requisite for such a service, and that, for the purpose of obtaining efficient services, and in recognition of a learned profession, such officers should hold rank as commissioned officers.

Resolved, That the Committee on Legislation be and hereby is instructed to forward copies of these resolutions to the honorable Secretary of the Army and of the Navy, to the Surgeons-General of the Army and Navy, and to the Chairmen of the Army and Navy Committees of the United States Senate and House of Representatives.

Professor Bedford announced the death, on Sept. 13th, of Mr. Henry T. Kiersted, one of the oldest apothecaries in the United States, who entered the drug business in 1814, and who was President of this Association from 1860 to 1862.

Resolutions of thanks to the Entertainment Committee, the press, and to the past officers were passed, and the Association then adjourned to meet in Washington, D. C., on Sept. 11, 1883.

BRITISH PHARMACEUTICAL CONFERENCE.

Southampton has during the fourth week of August been the rendezvous of such pharmacists as have been able and had the inclination to avail themselves of the opportunity afforded by the annual meeting of the British Pharmaceutical Conference to vary the monotony of the ordinary routine of their lives by friendly intercourse with their *confrères*. The Conference commenced on Tuesday, Aug. 22, at half-past ten o'clock, in the Watts Memorial Hall, under the presidency of Professor Attfield, F.R.S., the visitors being welcomed, in a few well-chosen words, by Mr. Randall, speaking in the name of the local pharmacists. The audience was not so large as on some similar occasions in previous years, and did not nearly fill the area of the handsome hall in which the Conference met; whilst the general attendance appeared to be below the average, and this is confirmed by the number of signatures in the book placed at the entrance.

After a formal reception of the delegates present from various societies, the business of the meeting was commenced by the reading of the report of the Executive Committee. The report referred to the alterations that were introduced into the last "Year Book" and to the subject of grants in

aid of original scientific research. It also mentioned the resignation of one of the General Secretaries, Mr. M. Carteighe, in consequence of his accession to the Presidency of the Pharmaceutical Society of Great Britain, and stated that the consequent vacancy had been temporarily filled, at the request of the committee, by Mr. Sidney Plowman. From the financial statement it appeared that during the past year the expenditure had exceeded the income by about £65, which was partly due to a falling off in the number of members from whom subscriptions had been received. In alluding to this deficiency the President remarked that the introduction of the Parcels Post System would lessen the expense of distributing the "Year Book" in future, and he expressed an opinion that an appeal to the registered chemists and druggists who are not already members of the Conference should be followed by an increase of members sufficient to prevent a deficit in future years; further, that although the committee had felt compelled to defer for the present, for financial reasons, the compilation of the General Index which had been sugested, the postponement would only be of short duration.

The address of the President was undoubtedly the most important feature of the meeting. The Conference has been privileged in previous years to hear admirable addresses from different presidents, but in no previous year has a more marked impression been produced. As the address has been printed *in extenso*, it is not necessary to summarize it here, neither will this be the best opportunity for its criticism. As remarked by one of the speakers, it will doubtless be read with pleasure by all English speaking pharmacists, and the decided opinions expressed, couched in language that admits of little misunderstanding, will probably evoke a considerable amount of discussion. Indeed, that it has already attracted attention outside the pharmaceutical circle is evidenced by the fact that the "Times" has already devoted a leading article to the discussion of some of its topics. It will be sufficient to say here that the address was admirably delivered and was listened to with that silent attention which is sometimes better evidence of interest than the most boisterous applause.

The first papers read consisted, as usual, of reports of work undertaken at the request, and with the aid, of the Conference. The first was a "Report on the Differences between the Essential Oils of Cinnamon and Cassia," by Mr. A. H. Jackson. The reporter stated that, tested from a physical standpoint, the oils possess distinctive and characteristic odors and that the cinnamon oil has a more fiery taste than the cassia, but that neither the relative densities nor the refractive energies are sufficient guides in distinguishing mixtures of these oils, though the density of the oil of cassia was found to be somewhat greater than that of the oil of cinnamon. The chemical examination seemed to show that the constituent or constituents in which the oils differ from each other are present only in extremely small proportion. The next report was by Mr. A. W. Gerrard, "On the Alkaloidal Value of Belladonna Plants," which was a continuation of a report on the same subject presented last year. The experiments referred to in the report were made upon uncultivated plants in their first year's

growth, from a chalk soil in Yorkshire and from a leaf mould in Sussex, and also upon cultivated plants in their second year's growth, gathered in May, June and July, or before flowering, whilst in flower, and whilst in fruit. The results obtained with the wild plants indicated that belladonna in the first year of its growth contains a very small proportion of alkaloid, but to that extent they were confirmatory of previous deductions by the author that the formation of alkaloid in the plant is favored by a chalky soil. Experiments with the cultivated plant showed that the plant becomes most rich in active principles at the period of flowering and that the proportion is maintained in the fruiting season; further, that there is a simultaneous development of alkaloidal matter in the root and in the leaf, the former not being exhausted to strengthen the latter. A slight discussion followed, in the course of which Mr. Holmes remarked that he had observed that belladonna grows more luxuriantly in calcareous soils, which might perhaps account for its being richer in alkaloid. At the close of this discussion the Conference adjourned to luncheon, which was provided in an adjoining room.

On resuming, the first paper read was entitled "A New Styptic of Indigenous Growth," and contained some observations of Professor Quinlan upon the hæmostatic properties of the leaves of the *Plantago lanceolata*, or ribgrass. Notwithstanding the form of its title, the paper contained some interesting quotations from Shakspeare and Culpepper, proving that the ribgrass long ago had a great reputation as a styptic. Professor Quinlan exhibited some pharmaceutical preparations of the plant, but it would appear that for external application the dried leaves are effective or the fresh leaves in a paste such as would be produced by mastication. It is not quite clear in what manner the leaf acts, but some experiments appeared to show that it is devoid of any kind of tannin, and it was suggested by Professor Tichborne that if there were an astringent principle present it might be allied to the catechuic acid compounds. Mr. Borland said that *Plantago lanceolata* had long been used in the district in which he lived to staunch the bleeding of wounds, but he had hitherto thought that it was merely because they formed a convenient covering of a wound.

A *résumé* was then given by Mr. W. A. Shenstone of "Some Experiments on English Oil of Lavender," which had been nndertaken to test statements made by foreign chemists to the effect that oil of lavender sometimes deposits in cold weather a camphor, identical with common camphor, and that the oil contains a hydrocarbon boiling at a very high temperature (200° to 210°C.). Mr. Shenstone was unable to confirm either of these statements, the oil used by him evidently not containing any notable quantity of crystalline constituents, whilst the distillate collected about the temperature mentioned contained a large amount of oxygen. It would also appear from the independent experiments of the author and M. Bruylant that the English and foreign oils of lavender differ very considerably in the amount of terpene which they contain. It may be remarked, in passing, that Mr. Shenstone's *résumé* was evidently appreciated by the audience, and it is worth consideration whether it would not be better, as a rule, to summarize papers containing a large number of details that cannot

be followed in the reading and to present the general results in such a form that they can be readily grasped, and, if necessary, discussed. No person in the habit of attending scientific meetings like the Conference can have failed to observe the weariness that becomes evident in the audience during the reading of even valuable papers, the drift of which is obscured by the multitude of details.

Next Mr. Parker read a meritorious paper upon "Terpin Hydrate: its Preparation and Crystallography," which had been suggested by the occurrence of some crystals in a jar of furniture oil, supposed to have been compounded chiefly of linseed oil, turpentine, butter of antimony and methylated spirit. The author does not seem to be aware that the formation of such crystals in furniture polish is by no means a new experience; but it may be mentioned that in the early days of the School of Pharmacy, Bloomsbury Square, the conditions under which the formation of such crystals took place was the subject of many experiments in the laboratory, though without any satisfactory result being arrived at. Besides an elaborate description of the crystallography of terpin hydrate, the paper contained details as to its preparation and physical properties, and it mentioned the interesting fact that it is probable that terpin hydrate may be made to yield several aromatic oils by the action upon it of dehydrating substances under suitable conditions.

The next paper was on "A New Method of Making the Volumetric Solution for Estimating Hardness of Water," by Professor Tichborne. The novelty consists in the use of an oleate of soda, the preparation of which he describes, in the making of the soap solution. Dr. Symes then read "Some Notes on Brazilian Drugs," in which he described a gum derived from the *Acacia Angico*, known in Brazil under the name of "resin de angico," and said to be useful for chest complaints. Another drug referred to was a species of elemi, named "almesca," differing in some respects from the elemi of commerce. The last drug described was a bark named "casca de guassatunga," from which in Brazil an alcoholic tincture is prepared said to be useful in the treatment of snake-bites.

The chair was now taken by Mr. Groves, whilst a paper was read by the President, entitled "Half-an-hour with a Few Sheets of the New Pharmacopœia of the United States." The sheets upon which the remarks were based had been placed at the disposal of Professor Attfield by the courtesy of Professor P. W. Bedford, President of the American Pharmaceutical Association, who is also a member of the United States Pharmacopœia Committee. The work is printed in large octavo, and the divisions into the two classes of "Materia Medica" and "Preparations," which obtains in the last edition, is abandoned in favor of one simple alphabetical arrangement like that of the British Pharmacopœia. The system of chemical nomenclature advocated by Professor Attfield is again followed, and the author of the paper justly claimed that this proved that it was practicable and serviceable in the medicine and pharmacy of an English-speaking people. The old system of weights and measures is abandoned and the formulæ are, as a rule, expressed in parts by weight, but in cases where particulars of volume as well as of weight are required the metric decimal system

is employed. The Pharmacopœia opens with a new class of preparations termed "Abstracts," which are alcoholic extracts mixed with sufficient sugar of milk to make one part of the preparation represent two parts of the original drugs. The class includes abstracts of aconite, belladonna, conium, digitalis, hyoscyamus, ignatia, jalap, nux vomica, podophyllum, senega and valerian. A list of the additions and omissions was given, which cannot be referred to here further than to notice that "aconitia" is omitted, notwithstanding the assistance afforded to the Pharmacopœia Committee by Dr. Wright in respect to a definition of that substance. Further, the doses of drugs are not given, temperatures are stated in Centigrade degrees with Fahrenheit equivalents in brackets, chemical formulæ are inserted as in the British Pharmacopœia, and the molecular weight is appended to each formula. The interest excited by this paper was increased by the fact that Professor Redwood took the opportunity of stating that the preparation of a new edition of the British Pharmacopœia is now in contemplation. He said that he had little doubt that in it the same system of nomenclature would be adopted as in that of the United States, but he spoke with less certainty as to the adoption of the plan of indicating quantities in parts by weight, although he approved of the system and had himself worked it out years ago. He remarked that with respect to the Pharmacopœia of Great Britain a greater conservatism was exercised by the Medical Council than by the body that controlled the United States Pharmacopœia, since it did not introduce any unproved remedies. The reading of this paper brought the first day's business to a close.

In the evening a visit was made to the picturesque ruins of Netley Abbey by upwards of sixty members and visitors, carriages having been provided by the Local Committee. The pleasure of the excursion was slightly marred by atmospheric influences, the splendid view of Southampton Water and the opposite coast being nearly destroyed by the driving rain and mist; but notwithstanding this untoward circumstance the trip proved a very enjoyable one, and much interest was excited by the ruins.

On Wednesday morning the proceedings were resumed by the reading of a paper on "Some Reactions of Arsenic," by Messrs. Naylor and Braithwaite. The first portion of the paper was devoted to the results of some experiments made to test a statement of M. Patrouillard, and introduced into some text-books, to the effect that arsenic acid is easily reduced to arsenious acid by the action of oxalic acid. The authors failed to obtain any confirmation of this statement and expressed an opinion that oxalic acid exerts no reducing action under the conditions described by M. Patrouillard. The remainder of the paper was devoted to an account of the method followed in employing the copper-test, which is based upon the fact of the solubility of cupric arsenate in the double tartrate of potassium and sodium, and to a description of the decomposition which takes place between arsenious acid and mercuric salts.

The next paper read was entitled "Some Results of the Action of the Digestive Ferments on Drugs," and was by Mr. G. Brownen. It described the effect produced by solutions of the gastric ferment and pancreatic solutions upon a number of drugs and their preparations. The results obtained

suggest that this field of investigation will prove not only interesting but important to the physiologist, though evidently the value of such experiments will be increased in proportion as the conditions under which they are performed resemble those which occur in the human economy. It was pointed out in the discussion which followed that those conditions are very difficult to imitate, especially such of them as obtain in cases of disease, and it was objected by Mr. Plowman that the temperature at which the experiments were conducted (50°C.) exceeded that of the human body. Some little amusement was caused by the prohibition by the President of any reference to such a subject as "vital force" and by the difficulty some of the speakers experienced in their attempts to avoid the veto.

Mr. E. M. Holmes commenced his "Remarks on the Root of *Aconitum Napellus* and Allied Species" by pointing out that although aconite has long been in use in medicine, and is recognized as one of the most powerful of medicinal agents, its internal administration in this country is not so great as might have been expected. This he considers to be possibly due to variation in the strength of official preparations, and without attributing this variability altogether to the non-recognition in the Pharmacopœia of well-known facts he says that it appears certain that the requirements of the Pharmacopœia might be complied with and yet preparations of very variable strength be the result. He points out that the figure of the root referred to in the Pharmacopœia is totally inadequate to distinguish the root of *Aconitum Napellus* from that of other less poisonous species, and that the roots imported from Germany are collected by peasants not possessed of any botanical knowledge and sold without any guarantee as to the time of their collection. The difficulty is increased by the fact that the numerous aconites are closely allied, the varieties running one into another, whilst a complete series of the members of the genus is hardly to be found for reference in any botanical garden or museum. He, therefore, considered it worthy of inquiry whether the aconites available for pharmaceutical preparations might not be characterized for practical purposes by the effects produced by them when chewed. He found that the roots of several species did not cause a tingling sensation upon the tongue, including some plants which presented the specific characters of *Aconitum Napellus*, though easily distinguishable from it by habit. But all the aconites in which this variation occurred were observed to flower later than the typical *Aconitum Napellus.* He expresses the opinion, therefore, that the only way to secure aconite of good and uniform quality is to limit the official drug to home-grown aconite, flowering in May and June and gathered while the plant is in flower. He remarks, in conclusion, that aconite is very easy to cultivate and that, considering the small quantity used, there is no reason why any chemist who has a small piece of garden should not grow his own aconite root. Contrary to what might have been expected after the reading of so practical a paper, no discussion followed, and it may be remarked that the comments made upon the papers read at this meeting, as a whole, were far fewer than in previous years.

"Ammoniated Extract of Ergot and a Process for its Preparation" was the title of the next paper read, which was contributed by Mr. A. W. Ger-

rard. The process consists in macerating 10 parts of crushed ergot for 8 or 10 hours, with frequent stirring, in 50 parts of cold water containing ½ per cent. of strong solution of ammonia, straining through flannel, washing the ergot from time to time with more ammoniacal water till exhausted, evaporating the strained liquor to five parts (any scum or fat arising to the surface being removed), treating the cooled extract with an equal volume of aromatic spirit of ammonia, decanting the clear portion after subsidence, filtering the remainder through felt or flannel and washing the residue with sufficient spirit to bring the volume of the extract to 10 parts. One part of the extract, which thus prepared is darker in color than the ordinary form, contains the soluble matter of one part of solid ergot; the average specific gravity is 1,000, and the dose is the same as that of the ordinary liquid extract. The advantages claimed for the preparation are that the ammonia not only by its solvent power insures a complete exhaustion of the active principles of the drug, but by its presence in the medicine induces a rapid action by acting as a nervous stimulant. In the discussion which followed it was suggested that the ammonia by forming a soap took up a portion of the oil present in ergot, and thus facilitated the permeation and consequent exhaustion of the drug. The official formula found several defenders, Mr. Greenish being of opinion that water extracts all the active principle from ergot if the oil be previously removed. On the other hand, Dr. Quinlan said that in practice he had found ammonia in a preparation of ergot to be useful as a corrective.

Mr. Symons then read a paper on "Tumefaction as an Aid to the Identification of the Varieties of Maranta Starch." It contained the results of experiments made by treating different starches with solutions varying from 0·5 to 1·5 per cent. of caustic soda and also by submitting them to various degrees of heat until tumefaction took place. He found that when potato, oat, Natal, tous-les-mois, wheat, Bermuda, sago, maize, cassava, St. Vincent and rice starches were treated with caustic soda for ten minutes, they required for their complele tumefaction solutions increasing in strength in the order mentioned, from potato with a 0·8 solution to rice which required a 1·3 solution. When tumefied by heat and arranged according to the degree of temperature required, the order of the starches was nearly the same, with the exception of oat and cassava. It is worthy of remark that when using the alkaline method of tumefaction the order of the starches bears out a conjecture recently put forward by the author, that the higher the temperature at which a starch grows the higher is its point of tumefaction.

The next paper read was on "The Purity of Commercial Salts of Gold," by Mr. F. W. Branson. It gave the result of the examination of some fifteen-grain tubes of commercial salt of gold, eight of which were found to be correct within reasonable limits, whilst four showed a deficiency of 8 per cent. in weight or 5 per cent. in metal. The latter, although obtained from a reputable house, bore neither trade mark, seller's name nor guarantee label.

In the paper next read, on "The Iodides of Bismuth," by Messrs. F. W. Fletcher and H. P. Cooper, the authors described a new compound of bis-

muth, a very basic yellow iodide, represented by the formula $BiI_3.5Bi_2O_3$ or $3BiOI.4Bi_2O_3$, met with whilst testing metallic bismuth for lead.

The last paper read before the adjournment for luncheon was a note on "Microscopic Organisms in certain Inorganic Solutions," and contained the details of some experiments made as to the formation of a green vegetable growth in bottles containing solutions of sodium phosphate, magnesium phosphate and calcium sulphate, kept in the laboratory of the Yorkshire College of Science.

The Conference reassembled at 2·30 P.M., when a paper by Mr. D. B. Dott on "The Solubility of Morphia Salts" was read. It consisted principally of an adverse criticism of two papers on a similar subject by Prof. Power and Mr. J. U. Lloyd, and incidentally the author mentioned that he is engaged upon the compilation of a table of the solubility of morphia salts, the determinations being made at 60°F. In discussing this paper Mr. R. H. Parker suggested that it would be advantageous to establish standard conditions under which solubilities should be taken, since the solubility of many substances is much affected by varying circumstances. Mr. J. Williams said that he looked upon solubility as being closely associated with the power of crystallization, illustrating his remark by a reference to the compounds of caffeine recently described by M. Tanret, which he does not consider to be definite chemical compounds, but mixtures. Mr. P. W. Squire also pointed to the necessity of distinguishing between the point of solubility and the crystallizing point.

In some "Notes on the Pharmacy of Cinchona" Mr. R. W. Giles called attention to the unsatisfactory results that have followed the "fearful deterioration of Calisaya bark," both pharmacy and medical practice having been prejudiced through the consequent substitution of quinine for pharmaceutical preparations of the bark. He recommends that all pharmacists should keep in stock Indian or other non-official bark of sufficient alkaloidal value and that when opportunity offers they should educate the medical profession to the use of it. He considers that the standard adopted for the cinchona of pharmacy should be an alkaloidal and not a quinine standard, that it should be a mean and not an extreme one, and that it should admit barks from all sources. Further, he described a process for the determination of the alkaloidal value of cinchona bark which, he said, though simple and easy of manipulation, gives results near enough for pharmaceutical purposes. He expressed a preference for a fluid extract as a pharmaceutical preparation, but said that a fluid extract of cinchona worthy of its name was still a desideratum. In the discussion of this paper, Mr. Welcome recommended that the standard of a pharmaceutical bark should be fixed at 2 per cent. of quinine with a proper proportion of the other cinchona alkaloids. Mr. Southall spoke favorably of the decoction, which he said was largely used in the Birmingham district, and Dr. Symes said it was also a favorite preparation in Liverpool. On the other hand, Mr. Ekin reminded the Conference that he had found the decoction to be the preparation weakest in alkaloid. The discussion afforded Mr. Hampson the opportunity of saying that changes in the Pharmacopœia would be best effected, when necessary, under the advice of practical pharmacists, and

that the Pharmaceutical Society of Great Britain or the British Pharmaceutical Conference ought to be represented in the Pharmacopœia Committee in virtue of legal enactment.

"A note on the action of Glycerin upon some Salts of Iron," by Mr. G. F. Schacht, described the results of some experiments arising out of an alteration observed in a mixture made from the following prescription: "Tinct. ferri perchloridi, ʒiss; glycerini, ʒvi; aquæ, ad ℥vi." The mixture, when first prepared, was of a pale sherry color and possessed an astringent metallic taste; but the color afterwards nearly disappeared and the taste became sweet and metallic, but not astringent. The change was due to the reduction of the iron from the ferric to the ferrous condition, and experiments showed that this reduction takes place in the presence of ethyl alcohol, glycerin, and probably some other alcohols. Conversely, glycerin appears to retard though not absolutely to prevent the oxidation of the proto-salts. The President said that this action of alcohol upon a per-salt of iron had been long known, an ethereal spirit of chloride of iron prepared in this way having been formerly official in a continental Pharmacopœia.

In a "Note on a Reaction of Glycerin and Polyhydric Alcohols" Mr. W. R. Dunstan recorded the observation that the acid solution obtained by the addition of glycerin to an aqueous solution of sodium biborate becomes alkaline when heated. The reaction is also given by many other polyhydric alcohols and by certain sugars.

The interest excited by the introduction of Professor Barff's "Boro-glyceride" has induced Mr. D. Hooper to make some experiments upon the "Solubility of Boric Acid in Glycerin." He finds that at zero 100 parts of glycerin dissolve 20 parts of boric acid, that at 100°C. the quantity dissolved is increased to 72 parts, and that between these two temperatures the solubility is represented by an almost straight line.

Mr. B. S. Proctor having been somewhat skeptical as to the cause of the non-appearance of the results of oxidation in a commercial sample of liquor of iodide of iron, was induced to examine it, and the results furnished the subject of the next paper read. He proved the presence of phosphoric acid by its separation as ferric phosphate and that of oxalic acid by its separation as ferrous oxalate. The liquor also did not contain the quantity of iodide of iron required to make a syrup of full strength, when used according to the directions accompanying it. At the conclusion of his paper Mr. Proctor somewhat cynically suggested that if any pharmacist feels impelled to any other expedient than that of keeping his solution in contact with an iron wire he had better at least know what he is doing, and add the adulterations himself rather than buy the liquor ready adulterated, not knowing what it contains. Mr. Fletcher expressed a doubt whether any manufacturer who had a reputation to lose would add such a substance as oxalic acid, and, referring to the acidity of the liquor which had been mentioned by Mr. Proctor, said that it might be due to free hydriodic acid which is always formed. The usual *pro* and *con.* statements with respect to the permanence of syrup of iodide of iron and the effect produced by iron wire or light were made by different speakers, and Professor Tichborne expressed an opinion that a frequent cause of failure was that the heat was

not continued long enough in making the solution of iodide of iron to sufficiently remove the hydriodic acid formed.

A "Report on the Strength of Commercial Samples of Tincture and Liquid Extract of Opium," by Mr. J. Woodland, was then read. Fourteen samples of tincture had been examined, and taking the percentage of morphia present as a criterion, eight of them appeared to have been prepared from opium exceeding in morphia strength the Pharmacopœia standard; the other six were more or less deficient. Of ten samples of liquid extract of opium none reached the standard, and in one or two cases the percentage of morphia was very low.

The last paper read was a "Report on the Purity of Commercial Samples of Silver Salts," also by Mr. Woodland. It stated that caustic points had been found to contain from 25 to 36 per cent. of potassium or sodium nitrate, crystals of silver nitrate from none to 19 per cent. of the same diluents, and oxide of silver from 13 to 26 per cent. of impurities. It was remarked by the President that potassium nitrate is avowedly added in the preparation of caustic points in order to give them greater toughness, and Mr. J. Williams said that nitrate of lead is used for the same purpose. Both Mr. Williams and Mr. Naylor expressed surprise at the statements with respect to silver oxide, and said that it did not usually contain more than 1 or 1½ per cent.

The next business of the Conference would have been to decide as to the place of meeting in 1883; but the President having stated that it was not yet settled what town should be visited by the British Association, the arrangement with respect to Oxford having fallen through, it was agreed to leave the decision in the hands of the Executive Committee.

The election by ballot of officers for 1882–83 then took place with the following result:

President, Prof. Attfield, Ph.D., F.R.S., F.I.C., F.C.S.

Vice-Presidents,—M. Carteighe, F.I.C., F.C.S., London; J. R. Young, Edinburgh; C. Umney, F.I.C., F.C.S.

Treasurer —C. Ekin, F.C.S., Hounslow.

General Secretaries—F. Baden Benger, F.C.S., Manchester; S. Plowman, F.I.C., London.

Other Members of Executive Committee—Alexander Kinninmont, F.C.S., Glasgow; J. C. C. Payne, Belfast; W. A. H. Naylor, F.C.S., London; R. Chipperfield, Southampton; P. W. Squire, F.L.S., F.C.S., London; G. S. Taylor, F.C.S., London; J. C. Thresh, D.Sc., F.C.S., Buxton; F. W. Fletcher, F.C.S., London.

Auditor—James Spearing, Southampton.

Nothing now remained for the Conference to do but to record its sense of indebtedness to those friends who had contributed in various ways to make the meeting a success. First, the cordial and well-deserved thanks of the non-resident members were accorded to the Local Committee, and especially to Messrs. Randall, Chipperfield and Dawson, for the successful way in which they had carried out the arrangements. Then a vote of thanks was passed to General Cooke, Director-General of the Ordinance Survey Department, for his kindness in affording facilities to the members to visit

the Ordinance Survey Offices and inspect the operations going on there. Last of all came an enthusiastic vote of thanks to the President, for his conduct in the chair, and the members of the Conference then separated, not without some misgivings as to the weather for the evening excursion.

Any fears, however, which might have been entertained during the storm which raged on Wednesday night, as to the condition of the weather on the following day, were fortunately dispelled. The morning was faultless; the sun brilliant and the air delightful. Before half-past eight, the hour fixed for starting, members of the Conference were making a forced march to the pier-head, many, judging from an indescribable expression of "goneness" in their features, having evidently sacrificed breakfast to a heroic determination to be punctual. The steamer engaged for the trip was one of the finest boats in the Isle of Wight Company's service, and about one hundred and twenty excursionists, including a fair proportion of ladies, were on board, when a little before nine o'clock the signal for departure was given. The run to Ryde was most enjoyable, affording as it did, glimpses of many objects of interest; Netley Hospital, with its magnificent façade, and the ruins of the fine old Abbey close by, well contrasted the spirit of the Past and the Present, and Osborne, so delightfully situated amidst the peaceful beauty of its surrounding, evidenced the gentle spirit of its royal occupant.

Ryde was reached at 10.30, where a train was waiting to convey the party to Brading. Alighting here, a pleasant stroll through lanes and fields, rich in spoils for the botanist, brought the visitors to the remains of the Roman Villa. An inspection of the mosaic floors, some of which are in very perfect condition, and the many archæological treasures which have been turned up during the excavations, detained the company here until 12.30, when train was taken to Ventnor.

A short distance from the town, on the Bonchurch road, a substantial luncheon was served on the lawn in front of the residence of Captain Roache, who had kindly thrown open his grounds for the reception of the members of the Conference. The majority of the party then made their way through Bonchurch to the Landslip. The magnificent scenery of this spot is too well known to need description; suffice it to say that the expanse of sun-illumined sea on the right hand and the solemn grandeur of the gray crags to the left, intermingled with the varied tints of the luxurious foliage, made up a scene which by those who witnessed it for the first time will never be forgotten, and which by those who had already seen it many times before will ever be remembered with increased delight.

On the road along the cliffs to Shanklin stands the private residence of Mr. Gibbs, of Ryde, and at this point a pleasant surprise awaited the excursionists. Mr. Gibbs, gracefully assisted by his wife, welcomed into his house successive detachments of the party as they arrived; and beneath his hospitable roof every kind of comfort and refreshment was set before them. In the dining room were choice wines and fruits, and in the drawing room tea, coffee, and other light refreshments. Coming as it did so unexpectedly, and dispensed so courteously and generously, Mr. Gibbs' hospitality constituted one of the most delightful incidents of the trip.

After passing through the village of Shanklin and visiting its celebrated Chine, the party returned by rail to Ryde, and thence by steamer to Southampton, where at 7.30 high tea was served at the Royal George Hotel. Numerous speeches followed, and at a late hour the company dispersed, unanimous in the opinion that a pleasanter excursion had never been spent by the Conference.

Amongst the members of the Local Committee singled out for special thanks were Mr. Randall, the courteous Chairman, Mr. Dawson, the assiduous Honorary Secretary, and last, but not least, Mr. Chipperfield, the energetic "Acting Manager."—*Phar. Jour. and Trans.*, Aug., 26, 1882.

MINUTES OF THE COLLEGE.

The semi-annual meeting of the Philadelphia College of Pharmacy was held September 25, 1882, in the hall of the College, No, 145 North Tenth street.

The President, Dillwyn Parrish, presided, and the register showed an attendance of 24 members.

The minutes of the last stated meeting, in June, were read and approved.

The minutes of the Board of Trustees since the June meeting of the College were read by the Secretary of the Board, Wm. C. Bakes, and, on motion, adopted.

Alonzo Robbins, chairman of the delegation appointed to represent this College at the annual meeting of the American Pharmaceutical Association, reported as follows:

To the Philadelphia College of Pharmacy:

The delegates to the meeting of the American Pharmaceutical Association at Niagara Falls respectfully report that three of the original delegates attended the meeting, and that William B. Thompson was added to the number in place of Edward C. Jones, who was unable to attend.

The meeting was unusually large, and about 130 new members were obtained.

Our fellow-member, Charles A. Heinitsh, of Lancaster, Pa., was elected President of the Association for the ensuing year.

The Committee on Entertainment had prepared quite an extensive programme, but unfortunately they were unable to compel compliance with its terms by the proprietors of the hotel, thereby causing general dissatisfaction among the members of the Association.

It is to be hoped that at future meetings no reduction in hotel rates will be asked for, and no impositions submitted to.

The Association finally adjourned to meet at Washington, D. C., on the second Tuesday of September, 1883.

Respectfully submitted, ALONZO ROBBINS, *Chairman.*

Professor Maisch, on behalf of the delegates appointed to attend the Conference of Pharmaceutical Schools, held at the same time and place, made the following report:

To the Philadelphia College of Pharmacy:

The undersigned respectfully report that they have attended the Thirteenth Conference of Schools of Pharmacy, held at Niagara Falls, Sept. 13th. The Albany, Chicago, Cincinnati, Louisville, Massachusetts, Philadelphia, Pittsburgh and St. Louis Colleges were represented by delegates.

According to a resolution passed in 1881 the subject for discussion was the organization of an obligatory course in analytical chemistry, and the examination in this branch previous to graduation. The desirability of laboratory instruction in chemistry was generally conceded. But little concurrence of opinion was manifested as to the extent of such instruction; while several delegates urged the necessity of demanding attendance at a complete analytical course, including gravimetric and volumetric quantitative analysis, the large majority failed to see that the time for such a course could be obtained during the sessions of the Colleges, or that the end aimed at could really be attained. These views were expressed in the following resolution:

Resolved, That the importance of a knowledge of analytical chemistry is recognized by this Conference, and we believe that every effort should be made by the Colleges represented to encourage the study in the regular course of lectures; but it is the sense of this Conference that the course in analytical chemistry should not be made compulsory upon the student at the present time.

In nearly all the colleges a more limited analytical course, embracing mainly the requirements of the Pharmacopœia, in regard to the identity add purity of the medicinal chemicals, has been instituted, and has been made obligatory in several. The action of this College was explained, consisting in the elaboration of a practical scheme of analytical chemistry, limited in extent, which during the coming session is to be tried experimentally as an optional course for the senior students, with the view of making it hereafter obligatory, if necessary, with such modifications as may be ascertained by experience. The absence of all the professors placed in charge of the practical chemical instruction in the different colleges was a source of regret, since an interchange of their experience would have materially aided in furthering the objects of the Conference.

Three subjects have been selected for consideration at the next annual Conference, namely (1) the practicability of extending the course of instruction from five to six months, (2) the advantages of auxiliary instruction, and (3) preliminary examination.

Respectfully submitted, JOHN M. MAISCH,
JOSEPH P. REMINGTON.

Charles Bullock expressed his views relative to the advisability of increasing the list of honorary and corresponding members, stating that quite a number of those who had been with the College in that capacity had during the last few years been removed by death. Other members coinciding with him in this opinion, Mr. Bullock moved that a committee of three be appointed to revise the list, and report the result of their deliberations at the next meeting of the College. The motion being seconded, was adopted, and the committee was appointed in the usual manner, consisting of Messrs. Charles Bullock, Prof. J. M. Maisch and Prof. J. P. Remington.

Prof. Maisch again called the attention of the members to the importance of a better attendance of the monthly pharmaceutical meetings of the College, and expressed a desire that every member would exert himself to that end. All druggists, students and others interested in chemical and pharmaceutical science are hereby invited to attend these meetings, to read such original papers as they may prepare, and to participate in the discussions which take place.

An election for Trustees and a Committee on Deceased Members being in order, the President appointed Messrs. Thomas H. Potts and David W. Ross tellers, who upon taking the ballot reported the following gentlemen elected:

TRUSTEES FOR THREE YEARS.

William C. Bakes.................................. }
Edward C. Jones.................................. } Term ending September, 1885.
William E. Krewson,............................. }

Trustee for the unexpired term of Andrew Blair, resigned.

Prof. Frederick B. Power.

COMMITTEE ON DECEASED MEMBERS.

Charles Bullock, Joseph P. Remington, Alfred B. Taylor.

Then adjourned. WILLIAM J. JENKS, *Secretary.*

EDITORIAL DEPARTMENT.

THE MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION at Niagara Falls was more largely attended than any previous meeting, with the sole exception of that held in 1876, when the Centennial Exposition at Philadelphia was the main cause for drawing over 350 members to this place. The time which can be spared for relaxation and for relief from his engrossing duties by a pharmacist actively engaged in business is at best limited, and when it is considered that many members in different parts of the country, for years past, have made their brief period of vacation to coincide with these annual meetings, it is not to be wondered at that a large number went in quest of that recreation, which heretofore was often scantily provided, and that the attendance at the sessions had been thereby considerably reduced. At the last meeting the plan of holding only one session on each day was, we think, very successfully inaugurated, and under the able management of the efficient Entertainment Committee and Local Secretary, gave substantial pleasure to all visitors. We refer more especially to the various concerts by Wahle's band, to the ladies' reunion in Prospect Park on Tuesday afternoon, to the vocal concert by the Buffalo Singing Society, the Niagara Falls Liedertafel, and several soloists on Tuesday evening, to the excursion to the Whirlpool Rapids on Wednesday afternoon, and to the ramble on Goat Island and other delightful spots on Thursday afternoon. In addition to these the grand ball on Wednesday evening and the banquet on Thursday evening furnished not less enjoyable attractions to the large majority, and the pleasure was but little marred by the refusal of the hackmen to abide by their contract, by the threat of the hosts of the Cataract House to turn off the gas long before midnight, while the banquet was still in progress, and by other unpleasantries at this house. This official providing for remission from labor had the effect of making nearly all the sessions better attended, only the last one, more particularly the latter part thereof, leaving room for improvement, and we have no doubt that those present are unanimously in favor of retaining the services of the members of the Entertainment Committee as long as they can be found willing to serve in that capacity. By thus continuing their work from year to year their experience would soon become of still greater value, both in the matter of traveling arrangements to and from the meetings and of providing for substantial recreation and enjoyment after the sessions.

The organization of the Council, two years ago, had much influence in rendering possible such arrangements, inasmuch as the sessions of the Association have thereby been relieved of a very large amount of routine work, and of discussions relating only to executive measures, and we believe that in this direction there is still room for curtailing, without in the least interfering with the right of every member to be heard on any subject that may come before the Associatian, if such deliberations were held outside of the meeting at sessions specially held for the purpose under the auspices of the Council, so that only the results thereof would be brought forward for final

action by the Association. Nearly its whole time could then be devoted to the discussion of papers and of subjects of general pharmaceutical interest. It is true that the labor of the Council would thereby be increased, but we apprehend not the slightest difficulty in finding tried and experienced men, willing to give their time for the benefit of the Association, and for the furtherance of its objects.

Seventeen papers were read at the meeting, a smaller number than might have been expected from such a large representation. It has been suggested by several members that a falling off in the number of these essays must be expected in consequence of the multiplication of State and County Pharmaceutical Societies, by which bodies a number of papers would be absorbed which would otherwise have been presented to the National Association. We believe that such is not the case, or only to a very insignificant degree; but we are convinced that the fault lies rather in the defective manner of securing the co-operation of members. During the 26 years since queries were presented for investigation it has rarely happened that more than one-third of them have been answered at the next meeting. This failure is not due to indifference on the part of the acceptors, but in nearly all cases to causes which could not be foreseen at the time of acceptance; and it has thus happened that members who by the force of events were compelled to disappoint the Association in the expectation of receiving the results of their investigations, as a rule, afterwards refused to accept other queries so as to be relieved from the unpleasantness of breaking an implied promise. On the other hand, members who could and would have answered some of the published queries refrained from doing so because other members had been announced as willing to furnish the reply. In our opinion there exists no good reason whatever for this practice; on the contrary, we can see good reasons why it should be discontinued, and why the names of those willing to work for the Association, while they should be known to the proper committee, should not be made public. It would frequently happen that two or more members would investigate the subject, thus extending the investigation in different directions, and if one should be prevented from carrying out his intention, he would not hesitate to privately accept a subject on another occasion, because he would feel that by so doing he would not deprive the Association of communications from others. It should be remembered that the volunteer papers have occasionally outnumbered those written in answer to queries, and that at the late meeting eight valuable papers, out of the seventeen, were voluntary communications, made without a promise given a year or two before.

We can merely briefly refer to the excursions an the homeward trip. Those laid out by the Entertainment Committee were not very numerously participated in, because many members had been over the same routes after the meetings held in Boston, Toronto and Saratoga; perhaps in no distant time a meeting in Maine or on the St. Lawrence River will again take the members to the same interesting country through which these excursionists traveled. A number of the members visited Watkins' Glen, Trenton Falls, Howe's Cave nd other places of interest, as far as we have learned, all highly pleased with their journeys.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The Prescription of Proprietary Medicines for the Sick; Its Demoralizing Effects on the Medical Profession. By C. A. Lindsley, M.D., etc. New Haven. Pp. 16.

The essay was read before the Connecticut Medical Society in May last. We are pleased to notice that the medical profession seems to be waking up to the evil effects of proprietorship in medical preparations.

Ten Years' Experience in the Treatment of Stricture of the Urethra by Electrolysis. By Robert Newman, M.D., etc.

Reprint from the "Medical Record," August 12 and 19, 1882.

Life of John M. Briggs, of Bowling Green, Ky. By W. K. Bowling, M.D.

The Antiseptic Treatment of Wounds after Operations and Injuries. By W. T. Briggs, M.D.

Reprints from the "Nashville Journal of Medicine and Surgery," July and August, 1882.

Proceedings of the Ohio State Pharmaceutical Association at its Fourth Annual Meeting, held in Zanesville, May 17 and 18, 1882. Cleveland, O. 8vo, pp. 95.

Proceedings of the Fourth Annual Meeting of the New York State Pharmaceutical Association, held in Albany, Wednesday and Thursday, June 20 and 21, 1882. Elmira, N. Y. 8vo, pp. 160.

Reports of these meetings will be found on pages 331 and 380 of this volume.

Die Naturgeschichte des Cajus Plinius Secundus. Von Prof. Dr. G. C. Wittstein. Leipzig: Gressner & Schramm. 12, 13, 14 Lieferung.

Plinius' Natural History. Parts 12, 13, 14.

This publication has proceeded to Book xxxvi, treating of rocks and stones.

The Relation of Pharmacy to the State. Introductory Address delivered to the Members of the Conference on August 22, 1882, by the President, Prof. John Attfield, Ph.D., etc. 8vo, pp. 22.

An excellent address, which we hope to find opportunity for referring to more in detail.

Diseases of the Rectum and Anus. By Charles B. Kelsey, M.D., Surgeon to St. Paul's Infirmary for Diseases of the Rectum, etc. New York: Wm. Wood & Co., 1882. 8vo, pp. 299.

It has been the author's endeavor to give, as far as possible, in a condensed manner, all that is positively known on the subject of this treatise, and to arrange the material in a form suitable for ready reference. The diseases and their treatment are considered in separate chapters, wherever it seemed of advantage illustrations have been resorted to, and in the more important cases references are given to the journals and works containing original essays referred to. A full table of contents and index render the work more useful for ready reference.

THE AMERICAN JOURNAL OF PHARMACY.

NOVEMBER, 1882.

RESINA SCAMMONII.

By Charles A. T. Doench, Ph.G.

From an Inaugural Essay.

The author endeavored to purchase scammony root in Philadelphia and New York, but failing in this procured a quantity from London through a Philadelphia house; the root was of fine appearance, and answered the description of the genuine root in every respect. It was powdered and passed through a sieve, No. 60, and in a percolator exhausted with stronger alcohol, after a prolonged maceration for five days. From 5 kilos of the root 8 liters of tincture were obtained; to this half a liter of water was added, most of the alcohol was recovered by distillation, and the residue, measuring nearly two liters, was poured into a large quantity of cold water. The precipitated resin was repeatedly washed with warm water, then dried, redissolved in a small quantity of alcohol, filtered, again precipitated in the manner described, and carefully dried. The yield was 270·46 grams, or 5·4092 per cent.

Thus obtained, the resin was of a greenish-gray color, and answered the tests of the Pharmacopœia for the resin of scammony. Its behavior showing a decided difference from that of some commercial scammony, three samples of the latter were procured from different wholesale houses, and examined by treating 5 grams of each successively with ether, benzol, oil of turpentine, alcohol and water; each solution was evaporated, by means of a water-bath, to dryness, and the residue weighed, when the following results were obtained:

	Soluble in					Insoluble matter.
	Ether.	Benzol.	Oil turp.	Alcohol.	Water.	
I.	1·574	0·025	0·020	1·270	1·030	1·081
II.	1·173	0·023	0·720	0·303	1·574	1·199
III.	2·695	0·022	0·434	0·733	0·586	0·530

The etherial extracts were dissolved in warm solution of potassa,

and to the solution an excess of hydrochloric acid was added, which in each case produced a precipitate; this was weighed, the weight deducted from that of the etherial extract, and the remainder regarded as pure scammonin, amounting in I to ·599 gram, or 11·98 per cent.; in II to ·546 gram, or 10·92 per cent., and in III to 2·258 gram, or 45·16 per cent. The precipitate from I was dark brown, and was not colored brown or cherry-red by concentrated sulphuric acid, nor did it acquire a blue color with oxidizing agents, and was therefore neither rosin nor guaiac resin. The precipitates from II and III were light yellowish-brown, became dark red with sulphuric acid, and were regarded as consisting chiefly of rosin.

The portions dissolved by benzol, oil of turpentine and alohol were not further examined, since they could not contain any scammonin.

The aqueous solutions were heated to boiling; a precipitate occurring was treated with solution of potassium nitrate to ascertain from the solubility therein its identity with vegetable albumin. The boiled liquids filtered were tested with subacetate of lead and with borax for coloring matter and gum, and with Fehling's solution for sugar. The results were as follows:

	Color.	Heat.	KNO_3.	PbAc.	Borax.	Fehling's solution.
I.	Light yellow.	Curdy precp.	Soluble.	Copious precp.	Copious precp.	No precp.
II.	Straw color.	Curdy precp.	Partly soluble.	Precipitate.	No precipitate.	Precipit.
III.	Dark color.	No precipit.	....	Precipitate, decolorized.	No precipitate.	Precipit.

The ashes obtained on incinerating the samples were incompletely soluble in dilute hydrochloric acid; the acid solutions contained calcium and, in samples I and II, also magnesium.

ON THE ACTION OF IODINE PENTABROMIDE ON VOLATILE OILS.

By Chas. McClellan Forney, Ph.G.

From an Inaugural Essay.

The author prepared iodine pentabromide, IBr_5, by dissolving 127 grains of iodine in 400 grains of bromine. All the oils used were of the best commercial quality, and pure. The test was applied by placing 5 or 6 drops of the volatile oil on a watch-crystal and adding 1 drop of the pentabromide. Corresponding experiments were performed, also, with the same volatile oils previously mixed with 25 per cent. of oil of turpentine and the same proportion of 95 per cent. alcohol. Croton oil was examined in the same manner. The results are tabulated as follows:

Oı

Almond
Amber,

Anise.
Bay.

Bergam

Campho

Carawa
Cassia.
Cinn'n,

Cloves.
Copaiba

Cròton.
Cubeb.

Fennel
Hemloc

Horsem
Junipe

Lavend
Lemon.
Orange

Pennyr

Pepper

Piment

Rosem
Sassafr

Savin.
Spearn
Spruce
Tansy.

Winte

Oils.	Pure Oils.		Oils + 25 per cent. Oil of Turpentine.		Oils + 25 per cent. Alcohol.	
	Reaction.	Color.	Reaction.	Color.	Reaction.	Color.
Almond, bitt'r	None.	Orange-red.	Sl't react'n and sputter'g.	Brownish-yel.	None.	Orange-red.
Amber, rectfd	Slight.	Cloudy green; dark precip.	Brisk; efferv.; sl't sputt'g.	Brown-red.	Slight effervescence.	Cloudy olive; black precip.
Anise.	Violent; sputtering.	Brown-red.	Very violent.	Yellowish-brn.	Brisk; slight effervescence and sputtering.	Brown-red.
Bay.	Violent; brisk effervescence; sputtering.	Brownish-gr'n.	" "	Colorless or yellowish.	" " "	Olive-green.
Bergamot.	Violent; brisk effervescence; sputtering.	Olive-green.	" "	Brownish, then greenish-yel.	" " "	Brownish.
Camphor.	Violent; brisk effervescence; sputtering.	Brownish-red.	" "	Brownish-red.	Brisk effervescence.	Brown-red.
Caraway.	Viol't; brisk effv.; sputt'g.	Greenish-yel.	" "	Reddish-brown	Slight "	Cloudy, brownish-yellow.
Cassia.	Slow, slight effervescence.	Greenish-br'n.	Brisk effervescence.	Cloudy, blackish brown.	" "	Yellowish to greenish-br'n.
Cinn'n, Ceyl'n	Viol't; brisk effv.; sputt'g.	Cloudy, blackish-brown.	Very violent.	Olive-gr'n, then greenish-bl'k.	" "	Brown-red.
Cloves.	" " "	Br'n sediment.	" "	Dark brown.	Brisk; slight efferves.	Cloudy, yellow.
Copaiba.	Sl't; gentle eff.; gr'n vapors	Green.	Brisk; efferv.; gr'n vapors.	Brownish, then olive-green, bl'k precip.	Slight; green vapors.	Green.
Croton.	None.	Greenish-yel.	Brisk effervescence.	Brown-red.	None.	Cloudy, yellow.
Cubeb.	Viol't; brisk effv.; sputt'g.	Grn'ish-yel.; dk gr'n upon mixing or stirring.	Very violent.	Cldy, inky, then clear, olive-gn	Like pure oil.	D'k to light g'n.
Fennel.	" " "	Brown-red.	" "	Dark brown.	Slight effervescence.	Red-brown.
Hemlock.	" " "	Brownish-yel.	" "	Brownish-yel.	Brisk; sl't eff. and sputt'g.	Cloudy, yellowish-brown.
Horsemint.	" " "	Brownish-red.	" "	Straw-yellow.	Brisk effervescence.	Brownish-red.
Juniper.	" " "	Gr'n; bl'k prep.	" "	Sea-green.	Brisk; sl't eff. and sputt'g.	Gr. and br. layers; after mixing, dark gr'n
Lavender.	" " "	Greenish-br'n.	" "	Greenish-br'n.	Brisk; slight efferves.	Yellowish-br.
Lemon.	" " "	Brownish-yel.	" "	Cloudy, d'k yel.	Brisk; sl't eff. and sputt'g.	Yellow and br. layers; not miscible.
Orange.	" " "	Black precip.	" "	Cloudy, dirty violet; then clear, d'k yel.	" " "	Brownish-yel.; brown precip.
Pennyroyal.	" " "	Cloudy, blackish-brown.	" "	Dark brown.	Like pure oil; less sputt'g.	Dark brown.
Peppermint.	" " "	Cloudy, blackish-brown.	" "	Cl'dy, purplish-black; then blue-bl'k and inky-green.	Brisk; sl't eff. and sputt'g.	Bright green, then cloudy.
Pimenta.	" " "	Greenish-br'n.	" "	Greenish-br'n.	" " "	Cloudy, greenish-brown.
Rosemary.	" " "	Reddish-brown	" "	Reddish-brown	Like pure oil.	Reddish-brown
Sassafras.	" " "	Yellowish, then light gray.	" "	Reddish-yel.	" "	Light brown.
Savin.	" " "	Greenish-br'n.	" "	Greenish-br'n.	Brisk; sl't eff. and sputt'g.	Cl'dy, yel'sh-br.
Spearmint.	" " "	Brownish-yel.	" "	Reddish-brown	" " "	Brownish-yel.
Spruce.	" " "	Dark brown.	" "	"	" " "	Light brown
Tansy.	" " "	Brownish-yel., then colorless.	" "	Reddish-yel.	" " "	Yel. and r'd layers; not miscible.
Wintergreen.	Slight; gentle efferves.	Reddish-br'n.	More active than with pure oil.	Straw color.	Slight effervescence.	Cloudy yellow.

The behavior of the oils of cinnamon, cubeb, juniper, lemon, orange, peppermint and tansy under the above circumstances seems to deserve attention. Except in a few instances, violet and orange-colored vapors were evolved during the reaction. The reactions were increased in the presence of oil of turpentine and diminished with alcohol.

CHLORINATED OIL.

By L. Wolff, M.D.

Under the above title I read, at the pharmaceutical meeting of May 6th, a paper which was printed in the June issue of the "American Journal of Pharmacy," and which at the time I thought to be the first account of this preparation, although I made no claim to that effect.

That there seems to be nothing new under the sun is in this instance again very striking, for Prof. Maisch called my attention recently to a letter from Mr. Hans Wilder, stating that in the German edition of Jourdan's "Pharmacopœia universalis" of 1846 this matter had already been printed. I reproduce it here to show how close alike was my own effort to that of yore, although I need hardly assure here that my experiments were altogether independent and without knowledge of earlier ones on this subject. I quote from the "Pharmacopœia universalis," second edition, London, published by Joseph Robins, 1833, vol. I, page 460,[1] as among the chlorine preparations:

"Oil with Chlorine.

"Oleum olivarum oxygenatum (Bat.)

℞ Olive oil, ... 16 oz.

"Put it into a large receiver, surround with cold water or snow, and pass through it a current of gas, disengaged from a mixture of one pound of muriate of soda, four ounces of oxide of manganese, and half an ounce of sulphuric acid diluted with water. At the end of two or three days, wash with water and preserve it.

"It is recommended by Nieman in tinea and herpetic ulceration."

As my paper did not claim as novelty the combination of chlorine with oils, but rather the exposition of how they combine, I think its value none the less, especially as, judging from the name of the older product, its chemical composition was certainly not understood; nor have I been able to find anything in literature illustrating or explaining the chlorine compounds with fat oils.

[1] The formula was also published in the original French edition of Jourdan's work of 1828.

Why the earlier writers should have adopted the name of oxygenated oil for it is hard to be explained, but that it was already at that time used with good effect in parasitic skin diseases seems to bear out what I had claimed for it.

I would add to what I had already said in my paper on the chlorination of fat oils, that for practical purposes it can be much easier and much more rapidly prepared by the direct contact between the oil and the chlorine generating mixture. The rapidity with which the chlorine is taken up by the oil leaves none to be detected in excess until the saturating point has been reached. I employ for this purpose a flask of ample capacity, and introduce a sufficient quantity of manganese peroxide with hydrochloric acid. After stirring I add the oil and place the whole in a water-bath, warming until active ebullition takes place. When vapors of free chlorine gas become evident, the process is finished. The oil is then allowed to separate, and is dissolved from the mass by benzin, which, on filtering and evaporating, leaves a chlorinated oil, saturated and of the description given by me previously.

October, 1882.

AN EASY METHOD FOR ASSAYING THE CINCHONA ALKALOIDS.

By R. F. Fairthorne, Ph.G.

Dr. J. E. De Vrij has written very favorably of a process for determining the amount of alkaloids in cinchona, which depends chiefly upon the facts that they are dissolved out by means of a mixture consisting of ether, 88 parts; solution of ammonia, 4 parts; and alcohol, 8 parts. After maceration and separation the solution is evaporated to dryness leaving the crude alkaloids, which are purified by solution in acidulated water, filtration and precipitation by means of an alkali and resolution in chloroform, which upon evaporation leaves the alkaloids pure.

It occurred to me that as the alkaloids are soluble in chloroform, that the following process would yield good results with less trouble and expense, and after having tried it I find by comparing it with Dr. De Vrij's that as good a yield of the alkaloids is obtained. Two portions of the powdered bark taken from the same package were operated on by the two processes and with identical results. By my method 400 grains of calisaya bark in moderately fine powder were boiled for ten minutes with 5 fluidounces of water acidulated with $\frac{3}{4}$

drachm of muriatic acid; when cool the liquid portion is filtered through absorbent cotton placed in the neck of a funnel, into which the powder having been transferred is rather tightly pressed, and two fluidounces of water poured on and allowed to percolate. This is added to the filtrate, and the powdered cinchona again boiled with 5 fluidounces of water acidulated with 30 minims of hydrochloric acid. This decoction is filtered in the same manner as the first, using the same funnel and cotton. The bark is then thoroughly exhausted by percolation with acidulated water, the acid used being muriatic in the proportion of 5 minims to the fluidounce. It required about 5 fluidounces to accomplish this. All the filtrates are now mixed and then refiltered through absorbent cotton. The filtrate is next thoroughly agitated with six fluidrachms of chloroform. When the chloroform has subsided the supernatant liquid is drawn off and the last portions carefully collected by means of a pipette. This operation is repeated with six more fluidrachms of chloroform. To the acid decoction is added solution of soda so as to render it strongly alkaline, and to this one and a half fluidounce of chloroform and well shaken. The latter having been removed to a tared capsule, the decoction is again agitated with six more fluidrachms of chloroform. This having been separated is poured into the capsule with the other portion of chloroform and allowed to evaporate at a moderate temperature. This leaves the alkaloids in a comparatively pure state, which weighed 16·20 grains.

The amount of alkaloidal residue left by De Vrij's process after evaporating the chloroformic solution was 16 grains. In order to obtain the active principles of the bark perfectly pure, dissolve this residue in 1 fluidounce of water acidulated with hydrochloric acid, agitated with 2 fluidrachms of chloroform; remove this, and having added $1\frac{1}{2}$ ounce of water and the same quantity of chloroform to the acid solution, render it decidedly alkaline by means of soda solution; agitate, remove the chloroform to a tared capsule, and repeat the process with 2 more fluidrachms of chloroform, which, when removed, is to be added to the rest and evaporated.

By this means a satisfactory determination of the percentage of active principles of Peruvian bark can be obtained without much trouble. The freshly precipitated alkaloids are soluble in chloroform, which affords a convenient mode of separating them. The various steps of this assay will be readily understood. By boiling the bark in acidulated water the natural combinations of the alkaloids are broken up by means of the stronger acid. Agitation with chloroform in the first place, before

the addition of the soda, removes any wax, resinous or oily substance present, and the subsequent treatment with a fresh portion after being rendered alkaline removes the alkaloids, whilst most of the coloring matter is retained by the aqueous portion. In order to save the chloroform distillation can be resorted to, care, however, being taken to remove any adhering alkaloid by repeatedly washing with chloroform the retort used.

DORYPHORA DECEMLINEATA.

By John D. Forbes.

From an Inaugural Essay.

Experiments with the Live Beetles.—The beetles were mashed in a mortar and macerated with different solvents.

Alcohol yielded a dark oily extract, having the characteristic odor, and when mixed with an equal quantity of resin cerate produced no irritation of the skin. The extract redissolved in alcohol and mixed with carbon bisulphide separated into three layers, the lowest of which was dark brown and soluble in water; neither this nor the two light-yellow layers above produced irritation of the skin.

Acetic ether yielded a tincture, which on treatment with carbon bisulphide separated likewise into three layers, in neither of which the presence of cantharidin was indicated.

Benzin used as a menstruum and the product treated with bisulphide of carbon, yielded a dark oil and extractive matter, but no trace of cantharidin.

The beetles were exhausted with potassa solution, the liquid neutralized with acid, evaporated, the residue treated with water and the undissolved portion taken up with alcohol; on evaporation a dark granular mass was left, which mixed with an equal weight of resin cerate, produced on the skin in three hours slight irritation and redness.

Experiments with the Dried Beetles.—The beetles were killed with ether, dried, powdered and exhausted by chloroform. On treating the product with carbon bisulphide a supernatant dark oily layer and a heavier light-brown liquid were obtained, of which the former, when applied to the skin of two persons, produced a tingling, burning sensation, and in twelve hours vesicles formed under the irritated surface. The remaining solution, evaporated to dryness and mixed with resin cerate, produced only slight irritation.

It follows from the above that the potato bug contains a vesicating principle, but it is uncertain whether it be identical with cantharidin.

A BISMUTHIC HAIR-DYE.

By A. Naquet.

The author states that he was induced by a knowledge of the injurious properties of the many hair-dyes that are put forward as perfectly harmless to make the attempt to produce one that should be fairly entitled to that description. Whilst working upon the subject he protected the different steps by patents, in order to secure priority, but having attained what he considers to be a satisfactory result he has now abandoned his rights for the public benefit.

M. Naquet's experiments were made in the direction of compounding a metallic tincture that should have an innocuous metal for a basis instead of lead, and for this purpose he selected bismuth. The preparation which was the subject of his first patent consisted of two solutions that were mixed immediately before being used, and he describes the method of making it as follows.

It has long been known that a solution of bismuth is obtained in treating bismuthic hydrate with a solution of bitartrate of sodium; but it is not very easy to prepare and not more than a very small proportion of the bismuthic hydrate employed is ever dissolved. M. Naquet therefore sought an easy method of preparing the double tartrate of potassium (or sodium) and bismuthyl ($C_4H_4NaBiOO_6$). The bismuth is dissolved in the smallest possible quantity of nitric acid and to this is added an aqueous solution of tartaric acid (3 parts of acid to 5 of bismuth) and a large quantity of water; the whole is then thrown on a filter and the precipitate washed. The wash water contains some bismuth, which can be removed by precipitating with a sulphide, then redissolved in nitric acid and used in a subsequent operation. The well washed precipitate, whilst still moist, is dissolved in a boiling solution of sodic bitartrate (12 to 15 parts of bitartrate to 5 of bismuth), then filtered, diluted with water, alcohol and glycerin, and again filtered. Each liter should contain 150 cc. of glycerin, 150 cc. of alcohol and 600 cc. of water. The proportion of bismuth present should be 2 grams of metal per 1,000 and if the liquor contains more or less it should be brought to that strength. The paper through which this liquid is filtered will retain some bismuth, precipitated by the alcohol; this can be redissolved in nitric acid and again used.

The bismuthic solution alone does not dye, but mixed with sodium hyposulphite it soon deposits sulphide of bismuth which dyes the

beard and hair. But as this mixture is quickly decomposed it must not be made until just as it is goiug to be used. This form of bismuthic hair-dye, therefore, requires to be sent out in two bottles, one containing the bismuthic solution, the other the solution of sodium hyposulphite (1 part of solution saturated in the cold diluted with 5 parts of water). When required for use these are mixed together in equal proportions.

The bismuthic product precipitated by tartaric acid and water can be dissolved by means of carbonate of potash, or by any of the caustic or carbonated alkalies, including ammonia, the liquid being after neutralized by a current of carbonic acid gas and filtered. But unfortunately this neutral product, or even one slightly alkaline, does not act as a dye when mixed with either hyposulphite of soda or flowers of sulphur. It can only be used by moistening the hair first with the bisthumic liquid, and then, after it has dried, with a solution of sulphydric acid or a sulphide.

This dye is said to have a progressive action, and to produce all the shades from a light flaxen to a deep chestnut color, according to the number of applications made.

The second patent was taken out for a preparation that could be sent out in one bottle, M. Naquet while pursuing his investigation, having found that an ammonical solution of the tartrobismuthic product will keep indefinitely when mixed with solution of hyposulphite of soda, if the containing bottle be kept well closed. Such a mixture is said to make an admirable hair-dye, it decomposing and depositing sulphide of bismuth in proportion as it loses ammonia and is acted upon by carbonic acid in the atmosphere. The degree of concentration of the liquid is not of great importance, nor the quantity of ammonia, The following is the working formula given by M. Naquet:

Dissolve 100 parts of bismuth in the smallest possible quantity of ordinary nitric acid (about 280 parts). To this liquor add a solution of 75 parts of tartaric acid in water and then a rather considerable quantity of water to ensure complete precipitation. The whole is then thrown upon a filter and the residue washed with water until the washings are no longer acid. The magma left on the filter is then put into a dish and solution of ammonia gradually stirred in until all is dissolved. The magma derived from 1½ kilogram of bismuth will require 0·8 or 0·9 liter of ammonia. To this liquor is added 75 parts of hyposulphite of soda in powder, and when the salt is dissolved the

product is filtered and put into bottles. In this state it is ready for sending into commerce, but it is of advantage to add 1 or 2 per cent. of glycerin; no addition of alcohol is necessary. The liquid so prepared would contain about 5 per cent. of bismuth. It may be further diluted with water if desired.

The hair or beard when saturated with this liquid acquires after five or six hours a deep chestnut color. Upon washing the hair this color disappears, giving place to a delicate flaxen color. By repeating the operation daily a stage is arrived at when, after passing through all the intermediate shades, the deep chestnut color remains persistent. —*Phar. Jour. and Trans.*, Sept. 16, 1882, from *Moniteur Scientifique*, [3], xii, 880.

RELATIVE VALUE OF ETHER WHEN PREPARED WITH "RECTIFIED" OR METHYLATED SPIRITS OF WINE.

By H. Bendelack Hewetson,

Honorary Consulting Surgeon, Reynard Hospital, Willingham Honorary Ophthalmic and Aural Surgeon, Yorkshire Institution for Infant Deaf and Dumb; Acting Surgeon, 7th West Yorkshire Rifles.

The subject of the safest drug with which to produce anæsthesia has been sufficiently discussed, and the verdict of those best able to judge has been given, out and out, in favor of ether, as against chloroform, when "properly administered by a skilled etherist." There are, however, two samples of ether in the English market to the relative value of which, I believe, the profession is not fully alive. The two forms of "spirits of wine" used in the manufacture of ether create in reality two kinds of ether, and the differences between them are important. Firstly, the ether prepared from rectified spirit is found less desirable as an anæsthetic by those who have used it, and it is not considered as safe, producing more sickness and laryngeal spasm in certain cases in which there is a tendency to such complications. Secondly, it is about twice the cost. For instance, the methylated ether costs 2½d. per ounce, and the rectified ether costs 4¼d. per ounce. I have not used the rectified ether in my own work, so cannot speak of individual experience of its actions. But of the use and applicability of the methylated ether—as the safest anæsthetic known, when carefully administered by means of Clover's inhaler—I can speak strongly as the result of my daily observation.

It is a very ordinary circumstance to occupy eighty seconds in pro-

ducing complete anæsthesia, without a struggle or a cough, and it is by no means extraordinary for a patient to be "fully under" *within* the minute.

In the case of short operations upon the eyes and the like it is hardly ever necessary to reapply the inhaler after it has been once removed for the operator to commence, the patient remaining sufficiently anæsthetic for an operation such as I have mentioned to be completed without hurry.

Anæsthesia can be prolonged with equal safety, even so far as to keep a patient in labor completely under its influence for upwards of *four hours,* the longest time which has happened in my experience.

Mythylated ether is, I consider, from this point of view, the safest and cheapest anæsthetic at present in use.—*Chemists' Jour.*, August 18, 1882, from *The Lancet.*

CHINESE CAMPHOR.

In China camphor is grossly adulterated with a glue obtained by boiling a rattan creeper, locally called T'êngtsai. This weed, growing luxuriantly in the interior of Formosa, from whence, as everyone is aware, all Chinese camphor is derived, is full of a glutinous matter which boiling water converts into a colorless glue. Mixing this with the pure camphor and a small percentage of water prevents evaporation, though naturally destroying the high quality of the article itself. Camphor so adulterated will keep, it is said, for a couple of months without loss; indeed, will bear the journey to Europe without suffering appreciable diminution. Experiments recently made have demonstrated the existence of two parts of glue to three of camphor in certain samples offered in the Tamsui market, rendering the article absolutely useless. Happily fire will readily detect the foreign body. Mr. Walter Lay, to whose admirable report upon the camphor trade in 1880 we are indebted for this information, adds: "I have obtained a sample of the plant from which the glue is obtained, but cannot find out what its botanical name is; indeed, I have not succeeded even in obtaining the correct Chinese characters for it. It is called locally T'êngtsai, but it doubtless has a more distinctive appellation than that, It is not given in the 'Topography of Tamsui.' Mention is made in the Wahu Report for 1878 of a plant which yields a glutinous sub-

stance on being boiled in water, and which is used in the manufacture of paper. The name given to it at Wahu is Yang Kout'ĕng, and this possibly may be the name of the creeper used here for the adulteration of camphor."

Before the ruthless axe of the Chinese woodcutter the beautiful inland forests still adorned by the graceful *Laurus camphora* are fast disappearing. The aborigines inhabiting the interior fight desperately for the possession of their woods, but each year sees a fresh tract surrendered to their indomitable enemies. To illustrate the difficulty attending the collection of the prized wood it may be mentioned, on the authority of the above-named gentleman that between five and six hundred Chinese were killed two years ago in the petty warfare which prevailed with the savages. Sooner or later there must be a dearth of camphor. With their customary want of common prudence the conquering race are recklessly clearing the ground for tea cultivation, burning up the camphor wood in tea-firing operations, for which purpose it can seemingly be used with great safety, despite the pungent fumes given forth.

Very little of the camphor manufactured in Formosa is consumed by the Celestials, nearly all being shipped to foreign countries. On the other hand, they continue importing for their own use the more precious natural article secreted by the *Dryobalanops camphora* of Sumatra and Borneo. For these concrete masses, commonly known as Camphor Baroos, fancy prices are still paid,—31*s*. a pound was the import price at Ningpo last year. Of this fine camphor, it may be added, but a small quantity finds its way to Europe; the relative cheapness of the manufactured article driving it quite out of our markets, although it is well known the native manufacturers in Formosa place no special reliance on their own product, which, they say, possesses little or no virtue—very little nowadays, one may opine, if adulteration is carried on to the extent asserted.—*Phar. Jour. and Trans.*, Sept. 16, 1882; from *Med. Press and Circular*, Aug. 2, 1882.

REMARKS ON THE ROOT OF ACONITUM NAPELLUS AND OTHER SPECIES.

By E. M. Holmes, F.L.S.

Read before the British Pharmaceutical Conference.

Although aconite has been used in medicine for at least a hundred years, and is recognized as one of the most powerful of medicinal

agents, its internal use is not quite so general in this country as its properties might lead us to expect. Perhaps this is owing to variation in strength of the official preparations, and to the known danger of using too large a dose. How far this variability is due to a non-recognition in the Pharmacopœia of well-known facts may be open to question, but it appears certain that the requirements of that book might be complied with, and yet that preparations very variable in strength might be the result. That such is the case is proved by the statements made by Mr. Cleaver concerning extract of aconite, and by the recent experiments made with the alkaloid, which have shown that one commercial sample may be seventy times stronger than another.

The Pharmacopœia describes aconite root thus:

The dried root of *Aconitum Napellus*, L. The root may be "imported from Germany, or cultivated in Britain, and collected in the winter or early spring, before the leaves have appeared."

In the first place the figure of the root referred to is totally inadequate to distinguish the root of *A. Napellus* from that of other less poisonous species, the variation in form being very great, according to the age and position of the root. In the second place the root imported from Germany is collected by peasants who, as a rule, are not possessed of botanical knowledge, and is sold without any guarantee that it is collected in winter or early spring; indeed it is difficult to understand how the root of *A. Napellus* could be found before or distinguished after the leaves have appeared. Thirdly, the root is not cultivated as a crop in this country, because it could not compete in price with the German drug.

Under these circumstances it is easy to understand why the alkaloid of commerce varies in strength and why the preparations are also liable to a similar fault It is also obvious that even the most careful chemical investigations of the commercial root must be founded on an unreliable basis, and that the results obtained by chemical analysis must, in consequence, be to a certain extent devoid of scientific value.

It becomes extremely important, therefore, that so powerful an agent should receive at the hand of the pharmacist far more attention than has hitherto been accorded to it, and that every means should be used to provide the medical profession with preparations of aconite as nearly as possible of uniform strength and perfectly reliable. This is the more desirable since aconite is now being used in the treatment of the lungs, in puerperal and other fevers, and in acute cases in which

prompt and reliable action is of the utmost consequence. The chief difficulty in making such a preparation is in obtaining the typical variety of the right species. De Candolle describes twenty-nine varieties of the official species, *Aconitum Napellus*, but whether all these forms, which possess the same specific botanical characters in common, have the same chemical constituents, and whether, like isomorphic crystals and isomeric bodies in general, they have a different physiological action, is very difficult to ascertain, seeing that it is by no means easy to identify them, for the following reasons: First, because a complete series of the members of the genus is hardly to be found for reference in any botanical garden or museum; secondly, because the varieties sold by florists are not always carefully named; and thirdly, because they cannot be procured in sufficient quantities for purposes of chemical investigation.

Moreover, botanists are not agreed as to the forms which should be placed under each species. Steudel enumerates about eighty which have been grouped under *A. Napellus* by different botanists. The aconites are so closely allied, and the varieties run so much into one another, like the willows, brambles, roses, mints and cinchonas, that even De Candolle has placed the same plant under two varieties. Professor Maximowicz, who has paid considerable attention to the species occurring in Japan, remarks, in a recent letter: "The genus *Aconitum* is, botanically speaking, a most difficult one, not one characteristic holding its own from species to species. It is a matter of personal opinion whether you accept a dozen species in all, while another thinks to separate thrice the number. I have observed them in Mandshuria and Japan very assiduously, and have despaired of finding well-defined species, for there will arise intermediate forms between such as in most cases are thoroughly different. One would think these were numerous hybrids, but they are as freely seed-bearing as the various hybrid aquilegias used to be."

Although it is almost impossible to define accurately in botanical terms the different aconites, it seemed to me worthy of inquiry whether those available for pharmaceutical purposes might not be characterized sufficiently for all practical purposes. It is well known that the Japanese peppermint plant, although botanically it offers no character to separate it from *Mentha sativa*, is already distinguishable by taste, and it is therefore natural to suppose that the different forms of aconite might be distinguished to a certain extent in the same way. Experi-

menting in this direction I found that the roots of several species of aconite did not cause a tingling sensation when chewed, and that this was the case not merely with the Asiatic species, *Aconitum uncinatum, heterophyllum* and *palmatum,* but that also several plants which present the specific characters of *A. Napellus,* although easily distinguishable from it by habit, present the same peculiarity. Of these I may mention that forms which were supplied to me under the names of *A. Napellus,* var. *pyramidale* and *paniculatum,* did not cause tingling when chewed, while others, such as *Stoerckeanum* and *albiflorum,* produced a slight, and others again, such as *A. autumnale,* a very powerful tingling sensation. Here a difficulty is met with in the fact that the plants are not always correctly named, either in botanical gardens or in the collections of florists, from labels becoming displaced. But all of the aconites in which this variation occurs, so far as I have observed, flower later than the typical *A. Napellus,* so that if the Pharmacopœia added to its description "the root obtained from plants flowering in May and June," and erased the words "imported from Germany," one cause of the unequal quality of the root would be removed. This is all the more important, since I have determined by direct inquiry that some florists would supply to a grower the plant flowering in May and June, and others would supply any variety of *A. Napellus* that happened to be in stock, no difference in the properties of the varieties being known to them. The only way to secure aconite of good and uniform quality appears to be to limit the official drug to home-grown aconite, flowering in May and June, and gathered when the plant is in flower. In this way there can be no mistake about the species, and the leaves collected at the same time could be used for making extract. Even if the root were thus not gathered in its most active condition, it would at all events have the advantage of uniformity of strength, which is of much more importance.

The aconite has the property of developing roots instead of leaf buds in the axils of the lower leaves, provided that these are covered with soil. Whether this property has been conferred on the plant with the view of enabling it to approach nearer to the surface when, as must often happen in its native mountains, the plant becomes almost buried by the fall of *debris,* or the earth washed away from the roots by floods, or to propagate the species when not under favorable conditions for producing seed, it could at all events be turned to account in cultivation, since

by earthing up the stems a larger yield of roots would probably be insured.

In testing aconite root by taste it must be remembered that the tingling sensation is often not developed for ten minutes, and lasts for two or three hours, so that half a day must be allowed to elapse before tasting a second sample, to prevent the chance of confounding the effect of one root with that of the next.

In conclusion, aconite is very easy of cultivation, and, considering the small quantity used, there is no reason why any chemist who has a small piece of garden should not grow his own aconite root.—*Phar. Jour. and Transactions.*

PREPARATIONS OF ACONITE.

By Dr. E. R. Squibb.

The tendency of the past few years to increase the number of the preparations of this among other very important and very active drugs, is very confusing and very unfortunate. One or two alternatives or duplicates each, for internal and external uses, should be sufficient for each active medicine, and then these could be easily understood and their relations of strength could be easily remembered. In the case of aconite, some of the confusion has arisen from changing the source of the preparations. Many years ago, when the leaf of the plant was alone used, it was shown that this part of the plant was much more variable in strength and more perishable than the root, and this was a very good reason for the change which then began, from the leaf to the root, and now preparations of the root are commonly used, but, unfortunately, those from the leaf are not yet entirely abandoned as they should be.

Then the alkaloid aconitia came into use, at first for external application only. But the use has very largely increased, and it is now given internally to a very considerable extent. Gradually the alkaloid of several prominent makers came into the market, and these were soon found to be of very different degrees of strength and untrustworthy and unsafe; and in all statements of dose or effects the particular maker had to be given, the average dose varying all the way between the $\frac{1}{6}$ and the $\frac{1}{200}$ of a grain. Then again, the very strongest of these when the dosage was compared with that of the root, bearing no apparent relation, the root being far stronger, or the alkaloid

far weaker in effect than ought to be from what was known of their relative alkaloidal value.

Then again the relation of strength between the leaf and the root has been left unsettled. Statements are to be found, by good authorities that they are equal in strength, and Stillé and Maisch (see The National Dispensatory, 1879, p. 97), give the minimum dose of powdered leaves or root as one or two grains, as though they were of the same strength. On the other hand, Bentley and Trimen (see Medicinal Plants, Vol. 1, No. 6), make the following statement: "Aconite root is by far the most active part of the plant; it is said to have six times the strength of the leaves." For these extremes many intermediate comparisons are to be found, and the writer up to this time has accepted the statement that the root was one-fifth stronger than the leaf, but now finds this to be a great and important mistake.

Of course all the preparations from the leaf have been duplicated in those from the root as the latter have come into use, and one or two have been added, so that the confusion has been and still is very great and dangerous.

There is now, in not very infrequent use, a powder, fluid extract, extract and tincture of the dried leaf, and an extract of the green or undried leaf. Then there is in more common use a powder, fluid extract, extract and four tinctures of very dissimilar strength, made from the dried root, and all these from the common officinal variety, the Aconitum Napellus. Then there are at least four very different aconitias or aconitines in common use in this country, and one or two more in Europe. There are, first, the ordinary "aconitia" or "aconitin," sold by one or more prominent manufacturers of chemicals in this country, but generally supposed to be imported from Germany. Second, the aconitine made by Merck, of Darmstadt, and bearing his label. This is largely sold and is supposed to be made from the A. Napellus. The same maker sends out an aconitine at more than three times the price of the first, labeled "Aconitine from Himalaya Root," probably from the A. ferox. Then Duquesnel, of Paris, sends out an aconitine which is in well-formed, colorless crystals, at about three times the price of the last. That is, the first aconitine costs about \$14.00 an ounce, avoirdupois. That of Merck costs about \$13.00 an ounce. The second, of the same maker, about \$40.00 an ounce,

and that of Duquesnel about $105.00 an ounce, or $3.75 per gram, by wholesale.

It is the general object of this note to ascertain the strengths of these various forms in which this important medicine is used, and to compare them so that equivalent doses may be known, thus endeavoring to clear up some of the dangerous confusion of dosage as it is now found in the books.

In order to do this in the simplest way, a standard of strength must be adopted by which to measure all the preparations; and the process by which the strength of the standard is obtained must be applied to all.

The best standard would of course be the proportion of aconitia, as that is the most important, though perhaps not the only useful active principle. But aconitia is in such very small proportion that no process of assay as yet prepared is practically applicable, or within the ability of the writer to apply. Besides, as will be seen later, aconitia, as met with, is quite as variable as the preparations of aconite, and this probably from different processes of extraction as well as from different species of aconite.

Some years ago (see Proceedings of The Amer. Pharm. Asso. for 1872, p. 229,) the writer published a note on aconite root, in which he gave a very easy test of the value of the root. At that time by careful selection bales of aconite root could be found in which, from an ordinary handful sample, eight roots out of ten, when broken at about the middle of the root, and a very small fragment bitten off and chewed for a moment between the front teeth, and in contact with the tip of the tongue, would give the peculiar aconite tingling sensation to the tongue and lips. This would be perceived within a few minutes, and would continue for a longer or shorter time in proportion to the size of the piece taken, and the strength of the root, as no two roots have precisely the same activity. This simple mode of testing has now served the writer well for some fifteen years past, and in 1872 eight pieces out of ten was a pretty high standard to adopt, but for two or three years past it is not uncommon to find bales in every large lot, of which every piece will give the distinct aconite tingling or numbness in some degree, and any one can get such an aconite root who will take the time and pains to select it. Therefore such root is now adopted as the standard for the purposes of this paper, and this physiological measurement

of the strength is also adopted. Of course, the taste or impression as a measure of strength cannot pretend to be very accurate, nor indeed accurate at all, but it is a very useful measure, and will serve all the practical purposes of the physician and the pharmacist. It is very highly probable, though of course not quite certain, that any aconite which does not give this sensation of tingling and numbness to the tongue, lips and pharynx is inert, and that the activity is in direct proportion to the amount or degree of the sensation from a given uniform quantity. Any bale of aconite root, every piece, or nearly every piece of which gives the tingling in some degree, must be powdered in order to get any fair average, and therefore it is the powder that must be adopted as the standard. But the powder is difficult to manage and to subdivide properly, and so its liquid equivalent, the fluid extract, is much better. A fluid extract well made by repercolation, and without heat, from such root, so as to represent the powder in the proportion of a minim to each grain, forms an excellent standard. It has become fashionable of late to add an acid and glycerin to the menstruum in making this fluid extract, but as they are neither necessary nor useful they are objectionable, alcohol alone serving all the purposes of complete exhaustion and preservation of the active principles. Any well-made fluid extract of good aconite root if added to water in the proportion of one part to six hnndred, or one-tenth of a minim in a fluidrachm, will give a distinct aconite impression to the tongue and mouth under the following conditions:

Put 12·5 fluidounces or 369 cubic centimeters of water into a proper vessel and add to it, from an accurate pipette, 10 minims or ·616 cubic centimeter of the fluid extract of aconite root; stir well, and allow it to stand covered for an hour. This forms a cloudy solution or mixture from which, however, nothing settles out.

If now the mouth be rinsed out well to free the surfaces from mucus and saliva, and a fluidrachm or 3·7 cubic centimeters of this solution be taken into the anterior part of the mouth, and be held there in contact with all the surfaces for one minute by the watch, and be then discharged, no immediate sensation will be felt. But within fifteen minutes a distinct aconite sensation, not amounting to tingling, but very suggestive of it, will be felt and will continue for a quarter or half an hour in greater or less degree. The sensation though distinct, is not pronounced, and if the attention was

taken by other matters it would escape unnoticed. Any good fluid extract of aconite root should stand this test. When one is met with which does not stand it, it may be systematically diluted to a lesser degree until the sensation is reached, and then the amount of dilution will approximately measure its shortage in strength. Negative results being obtained, the second trial should be with one-fourth or one-third of a minim to the fluidrachm, and then a less or a greater dilution from the indications thus obtained. This is the principle adopted for the comparison of all the preparations of aconite and for aconitia, which are now to follow. It was found by repeated trials upon three individuals that such a fluid extract when diluted in the proportion of one-third of a minim to the fluidrachm, or 1 part in 180, when used in doses of a fluidrachm, gave a pronounced impression which commenced in about 5 to 10 minutes, increased for three quarters of an hour, and was practically at an end in 1·5 hour. This made a very convenient dilution for comparison, and was therefore adopted as the general standard for comparison.

Powdered aconite leaf with all the sensible properties of a good article was obtained from a good source, and was carefully made into a fluid extract representing the powder in the proportion of minim for grain, the same menstruum being used as for the root, namely, stronger alcohol. The dilutions of this had a mawkish as well as a bitter taste, were slow in producing their impression, and the impression made was different in kind from that of the root, and getting into the throat gave a greater sense of constriction and desire to swallow repeatedly. The fluid extract being much more loaded with chlorophyll and albumenoid matters than that of the root it would naturally act upon the mucous surfaces more slowly, and with a somewhat diminished activity for the same strength of active principle. Making a fair allowance for this, the comparison of the fluid extracts showed that three minims of that from the leaf was about equal to one-third of a minim of that from the root. This makes the strength of the leaf to the root as measured in this way as 9 to 1, or makes the root nine times stronger than the leaf. This was very unexpected, and therefore the trials were repeated on different persons, and the conditions of the trial were carefully re-examined, but the results being tolerably uniform were accepted.

Then, if these results are trustworthy, the ordinary dose of the fluid

extract of the root being one minim, the equivalent dose of the fluid extract of the leaf would be nine minims, and this is probably the proper relation.

Next 100 cc., equal to 1,623 minims of the fluid extract of aconite root, which is equal to 1,623 grains of the powdered root, and weighs 88 grams, was evaporated to the condition of a solid extract of which it yielded 15 grams, or about 232 grains. This, calculated upon the powder represented, is 14·3 per cent. From this it is shown that the dose of the solid extract of aconite root which corresponds to one minim of the fluid extract and to one grain of the powder is, ·143 grain, or a little over an eighth (·125) of a grain, provided there be no loss of activity in the evaporation. But that there always is such a loss is well known, so that the equivalent dose is really greater in proportion to this loss. The U. S. Dispensatory gives the dose of this extract as one-sixth to one-quarter of a grain three times a day. The National Dispensatory gives one-sixth to one-third of a grain, and thus neither are out of the way.

Then 100 cc. equal 1,623 minims of the fluid extract of the dried leaf, equal to 1,623 grains of the powdered leaf, and weighing 86·8 grams, was evaporated to the condition of a solid extract, of which it gave 15 grams, or 232 grains, or 14·3 pc. of the weight of the powder.

Now, if the dose of the extract of the root be one-sixth to one-quarter of a grain, the equivalent dose of this extract of the dried leaf would be nine-sixths to nine-quarters of a grain, or one and a half to two and a quarter grains. This is a somewhat stronger preparation than the officinal "Extractum Aconiti" of the U. S. P., and the U. S. Dispensatory gives the dose of the officinal extract as "half a grain or a grain to be gradually increased if necessary," and the National Dispensatory gives the same dosage. This, as will be seen, is just about one-third of the proper dose equivalent to the dose they give of the extract of the root, and would doubtless be proportionately inefficient.

The British Pharmacopœia extract of the "Fresh Leaves and Flowering Tops of Aconite" cannot be compared with the above for want of proper data. The U. S. Dispensatory gives the dose of this preparation as one or two grains night and morning, and says that as much as twenty grains or more have been given in the course of a day. The National Dispensatory gives the dose as half a grain to a

grain. A pot of English extract labeled "Extractum Aconite, manufactured by George Allen & Co.," the word "leaves" being written on the wrapper in pencil, was bought for trial. This is supposed to be the officinal extract of the British Pharmacopœia. The appearance of the extract is good, and it is of proper pilular consistence. On careful comparison, a half grain of this extract dissolved in a fluidrachm of water was just about equal in effect to half a minim of the standard fluid extract of the root in the same quantity of water. So also the tenth of a grain of it gave about the same impression as the tenth of a minim of the fluid extract. The stated dose of the U. S. Dispensatory for this extract is, therefore, not far from correct, while the dose given in the National Dispensatory is one-half too small.

The next preparation still not uncommonly used is a tincture of the leaf, and when "tincture of aconite" is written or asked for, this is the preparation that is always dispensed by the careful pharmacist, though in most cases it is probably not what the physician wants. There is no authorized formula for this tincture in the principal pharmacopœias, it having been dismissed from them all. In the U. S. Pharmacopœia of 1860 the tincture is directed to be made of the strength of 2 troyounces to the pint. This is 8 minims of tincture to each grain of powdered leaf. And as the root is nine times stronger than the leaf, the 8 minims of this tincture would be represented by one-ninth of a grain of the powdered root or one-ninth of a minim of the standard fluid extract of the root. Then, as a minim of this fluid extract is the standard dose, the equivalent dose of this tincture of the leaf would be ($9 \times 8 =$) 72 minims, or 1·2 fluidrachm. This completes the commonly-known preparations of the leaf.

Of the preparations of the root, the powder, fluid extract and extract have been considered. The four tinctures of aconite root in common use are, first, that of the U. S. Pharmacopœia, which is 6 troyounces to the pint. This is 2·66 minims of the tincture to 1 grain of powdered root or 1 minim of fluid extract of the root.

Second. The tincture of the British Pharmacopœia, which is $2\frac{1}{2}$ avoirdupois ounces of powdered root to 1 imperial pint. This is (437·5 grs. $\times$ 2·5 =) 1,093·75 grains of powdered root in 9,218 minims of the tincture, or about 8·434 minims of the tincture to 1 grain of the powdered root, or 1 minim of fluid extract of the root.

The tincture of the German Pharmacopœia is 1 part by weight of the comminuted root to 10 parts by weight of diluted alcohol, s. g. ·892.

Diluted alcohol of ·892 s. g. weighs 6,506 grains to the pint of 7,680 minims. Therefore this tincture would be made from 650·6 grains of the powdered root to 6,506 grains of the diluted alcohol, and the product would be 7,680 minims of the tincture. Then each grain of the powdered root would be represented by (7,680 ÷ 560·6 =) 11·8 minims of the tincture.

Fleming's tincture of aconite root, as given in the U. S. Dispensatory, page 1492, foot-note, is made so that 16 troyounces of powdered root is nearly represented by 24 fluidounces of the tincture, which is in the proportion of 1·5 minim of the tincture to 1 grain of the powdered root or 1 minim of the fluid extract.

Compactly stated, the approximate equivalency is as follows: 1 grain = 65 milligrams of powdered aconite root of good quality, equal to 1 minim = ·0616 cc. of well-made fluid extract of the root is represented in

Alcoholic extract of aconite root, by	$\frac{1}{6}$ grain	=	11 milligrams.	
U. S. P. tincture " "	2·66 minims	=	·164 cubic centimeter.	
Br. P. " " "	8·434 "	=	·520 "	"
German P. " " "	11·8 "	=	·727 "	"
Fleming's " " "	1·5 "	=	·0924 "	"
Powdered aconite leaf, . . .	9 grains	=	·583 gram.	
Fluid extract of aconite leaf, .	9 minims	=	·554 cubic centimeter.	
Alcoholic extract of dried aconite leaf, ...	1·5 grain	=	99 milligrams.	
English extract of fresh plant, Allen's, ...	1 grain	=	65 "	
Tincture of aconite leaf, . . .	72 minims	=	4·44 c. centimeters.	

Therefore, if one minim of the fluid extract be the commencing dose, the columns represent the equivalent doses of all these preparations, provided the preparations be properly made from good material.

The same physiological test was applied to the four aconitias which are commonly used in this market, and the same standard was adopted in judging of their relative strength, namely, 1 minim of fluid extract of aconite root equal to 1 grain of powdered root. As before, the fluid extract was so diluted that each fluidrachm, or 3·7 cc., represented $\frac{1}{3}$ of a minim of the fluid extract, and a fluidrachm of this dilution was used for each trial, this being the quantity which gave a full, strong impression, the duration of which was about an hour and a half. The quantities of aconitia were all dissolved in this same quantity of water, and the impressions made were compared both in intensity and in duration by repeated trials. The primary solutions of the aconitias

were at first made by dissolving 1 grain, equal to 65 milligrams of the aconitia, in 50 cc. of water. In using these solutions it was discovered that they deteriorated very rapidly, and diminished in strength after the second day. In four days, the weather being very warm, they were quite inert, giving no impression at all. Floating shreds of mycelium were noticeable at times on the second day. The dilutions of fluid extract became inert quite as quickly as those of the aconitias, and it was very striking to observe that a dilution which would give a distinct impression one day might give none whatever on the next. The growth of the cryptograms appears to be a measure and the cause of the decomposition. Hence the indication is very plain that in the use of all such solutions for medicinal purposes, as well as for testing, they should be freshly made every day, or at most every two days, unless something be added to preserve them.

The best and almost the only definite authority found for the proportion of aconitia in aconite root was C. R. Alder Wright, D. Sc., Lond., whose investigations of the alkaloids of aconite were very thorough. In a paper contributed to the British Phar. Conference, and published in the "Year-Book of Pharmacy" for 1876, at p. 539, this author states that he obtained ·03 per cent. of pure aconitia from the root and 0.07 per cent. of total alkaloids, crystalline and non crystalline. He states the probability that upon a larger manufacturing scale, where the mother-liquors could be carried along to a better exhaustion, the yield might be increased to ·04 per cent. of pure aconitia. It may, however, be inferred from what he says that there is a considerable loss from splitting up of the aconitia into other bases, even from the best process of extraction, namely, that of Duquesnel, and it may be possible that all the bases existed in the root as aconitia. For the purposes of this paper this possibility will be assumed, and ·07 per cent. will be accepted as the proportion of aconitia in good root, although this is about double the quantity really obtained in working 224 lbs. of the root.

Upon this assumed strength of root, one grain of the powder, or its liquid equivalent, one minim of fluid extract, will contain seven ten-thousandths of a grain of aconitia (·0007). Then, as one-tenth of a minim of the fluid extract gives a distinct aconite impression in the mouth, it follows that a tenth of seven ten-thousandths of the alkaloid, or seven hundred thousandths (·00007) of a grain of good aconitia should give an equivalent impression. But, as will be seen hereafter,

this is so very far from being the case as to be outside of all probability of either error in calculation or error in degree of impression made.

The standard dilution for comparison adopted here is one-third of a minim of fluid extract diluted to one fluidrachm, and this, by the assumption of 0·07 per cent. of aconitia in the root, is equivalent to, or should contain ·00023+ grain, or say, for simplicity of expression, three ten-thousandths (·0003) of a grain. Then it follows that a fluidrachm or 3.7 cc. of water containing 0·0003 grain of pure aconitia should give a distinct full impression in the mouth of the duration of about 1·5 hour, which is very far from being the case, even with the strongest aconitia.

The following varieties of aconitia of the market were tried with the results stated:

There is no maker of aconitia in this country known to the writer. The first aconitia tried bears the label of a well-known manufacturing house of this country, but it is believed that they buy what in their judgment is the best they can get in Europe, and then put it forth with their own label. Unfortunately this is the aconitia which the writer has been ignorantly buying and using for more than a year past to make oleate of aconitia, and consequently the oleate has been proportionately worthless. Two grains = ·130 gramme of this aconitia was dissolved in 50 cc. of distilled water, acidulated with ·2 cc. of acetic acid. The trials were commenced by taking 1 cc.$=\frac{1}{25}$ of a grain of aconitia, diluting it with distilled water to 1 fluidrachm = 3.7 cc., and, under the conditions before described, holding it in the mouth for one minute. No impression was obtained until the dose reached 4 cc. $=\frac{1}{6}$ of a grain, and then the impression was hardly stronger than that from one-tenth of a minim of the fluid extract, and certainly no stronger than that from one-sixth of a minim of fluid extract. Therefore, this aconitia, costing $14 per ounce, is but just the aconite strength of a well-made fluid extract. Its solution, however, was so very bitter as to show that one or more other alkaloids were present, and it is possible that it mainly consists of a decomposition product named by Wright "picraconitine," from its bitterness. (See "Year-Book of Pharmacy" for 1877, p. 466.) This aconitia would have been tested farther but that the bitterness caused such a flow of saliva as to change the conditions of the trial.

The next variety of aconitia tried was that of Merck, of Darm-

stadt, the parcel used having been obtained from a trustworthy source here. The solution was made of double the strength of the last, namely, $\frac{1}{50}$ of a grain = 1·3 milligram to each cc. Of this solution 2 cc. gave an impression similar, but not stronger than that from one-third of a minim of the fluid extract, and, therefore, 6 cc. = $\frac{6}{50} = \frac{1}{8}$ grain of the aconitia was the equivalent to one minim of fluid extract, or it was found to be about eight times stronger than the first aconitia. Its solution was bitter, but not nearly so bitter as that of the first; and it required ·12 grain of it to give the impression made by ·0007 grain of the aconitia as present by calculation in one minim of the fluid extract.

The next variety tried was also made by Merck, and was labeled "From Himalaya Root." This, if from the A. ferox, as is probable, would be called by authors on this subject not aconitin, but "pseudaconitin," which is considered to be a different alkaloid. The solution of this for testing was made double the strength of the last, namely half a grain to 50 cc. of water and ·2 cc. of acetic acid, so that each cc. of the solution represented ·01 grain or 65 milligrams. Of this solution one-tenth of a cubic centimetre (·1 cc.) represented one-thousandth (·001 grain) of a grain, and this quantity in one fluidrachm of water gave an impression that was very difficult to detect. With ·2 cc. in the same dilution the impression was decided and continued for an hour or more. With ·4 cc. the impression was about equal to ·33 minim of the fluid extract, and therefore (·4 cc.$\times$3=) 1·2 cc. was about equivalent to (·33m$\times$3=) 1 minim of fluid extract. Therefore ·012 grain of this pseudaconitin is equivalent in physiological impression on the mouth to 1 minim of fluid extract. But the impression from this was different in kind from all the others, having less tingling and somewhat more of a peppery heat in it. It came on later than the others for the same degree of impression, increased and decreased more slowly, and was of longer duration. As ·012 grain was equal to 1 grain of powdered root, and as this latter contains about ·0007 grain of aconitia, it follows that the alkaloid in its natural condition in the root is much more powerful than when separated. It is just about ten times stronger than the last aconitia, or the ordinary aconitin of Merck.

The next variety tried—and the last—was that of Duquesnel, labeled "Aconitine Cristallisée, H. Duquesnel." This is in distinct crystalline form, while the others appear to be amorphous, and is quite

colorless, while the others are nearly white, excepting that from the Himalaya root, which is decidedly yellowish, and gives a solution of a yellow tinge.

The aconitia of Duquesnel was soluble in water, and the solution for testing was therefore made without acid, and like the last of the strength of half a grain, or 32·5 milligrams to 50 cc. of water. Therefore each cubic centimeter of the solution represented one hundredth of a grain, or ·65 gram, and each tenth of a cubic centimeter represented one thousandth of a grain, or ·065 milligram, and this latter quantity diluted to one fluidrachm with water gave a distinct though feeble impression in the mouth, generally at the tip of the tongue, going off in a quarter or half an hour. A dose of ·3 cc. = ·003 grain, or ·195 milllgram gave an impression just about equal to that from one-third of a minim of fluid extract. Therefore ·009 grain was equal to one minim of fluid extract, or one grain of powdered root. But the one grain of powdered root contains only ·0007 grain of aconitia, and yet nearly thirteen times as much of this aconitia of Duquesnel is required to make the same impression on the mouth.

Aconite root should yield about nine-tenths of one per cent. of aconitia in order to be in physiological equivalency with this aconitia of Duquesnel, but it really yields only about seven hundredths of one per cent. at the most, or about one-thirteenth as much.

This want of accordance in strength between the root itself, or the aconitia as it exists in the root in its natural condition, and this strongest of all the aconitias, is very remarkable and is inexplicable, but it certainly shows that there is great therapeutic as well as pecuniary economy in the use of the powdered root or its fluid equivalent, while the difference in strength between these aconitias shows that accuracy in dosage and in medication is altogether in favor of the root.

The impression made on the mouth by this aconitia of Duquesnel is very different from that of either of the other aconitias, and from that of the root. It is a more simple or less complex sensation, and seems to be the tingling element which exists in a less degree in all the others, and least of all perhaps in the pseudaconitia, which is farthest from this in the kind of sensation. The impression from the Duquesnel aconitia begins promptly—almost at once—while that from the pseudaconitia is delayed to five or ten minutes. The impression increases rapidly and is strongest about the tip of the tongue, has but a short

period of maximum impression, diminishes rapidly, and from small doses is very soon over. That from pseudaconitia increases slowly, is felt of nearly equal strength all over the surfaces of contact, has a long period of maximum degree, and diminishes so slowly that from a standard dose no more than two trials can be made in a day. The impression from the fluid extract and from the other aconitias is pretty plainly a mixture of the impressions from pseudaconitia and the aconitia of Duquesnel.

The relative strength of these four aconitias, as deduced from these trials, and as compared with one grain of the powder of good aconite root (German) is a follows:

Aconitia of unknown make,	1	grain	= 65	milligrams	=1	grain	of powder.
" Merck, ordinary,	$\frac{1}{8}$	"	= 8	"	=1	"	"
" " pseudaconitia,	$\frac{1}{83}$	"	=·78	"	=1	"	"
" Duquesnel,	$\frac{1}{111}$	"	=·59	"	=1	"	"

The relative strengths, therefore, are, 1 : 8 : 83 : 111. That is, the second is eight times stronger than the first; the third is ten times stronger than the second, and eighty-three times stronger than the first; the fourth is one-third stronger than the third, fourteen times stronger than the second, and one hundred and eleven times stronger than the first.

The doses of aconitia quoted in the United States Dispensatory are from the $\frac{1}{130}$ to the $\frac{1}{333}$ of a grain three or four times a day.

The National Dispensatory says that in view of the varying strength of aconitias the primary dose should not exceed the $\frac{1}{256}$ of a grain two or three times a day.

In a report by Dr. E. C. Seguin on the use of Duquesnel's aconitia in trigeminal neuralgia his dosage varied between $\frac{1}{96}$ and $\frac{1}{140}$ of a grain three, four and six times a day, according to circumstances.

As other authorities vary as much as those above quoted, it is evident that the confusion here is quite as great as in the preparations of the leaf and root.

In the use of aconitia for medical purposes it would seem to be essential that it should first be tested, and as this physiological test is simple and easy and within the reach of all, it seems better adapted to general use than chemical testing, and two or three graduated pipettes will enable any one to apply the test. No aconitia should be accepted which will not give a distinct impression from $\frac{1}{800}$ of a grain, or ·08 milligram diluted to the measure of one fluidrachm or 3.7 cc.

This is not too high a standard, for the reason that the aconitia of Duquesnel will give the impression from $\frac{1}{1000}$ of a grain or ·065 milligram. The dose of such aconitia to begin with need not be smaller than $\frac{1}{100}$ of a grain, or ·65 milligram, three times a day, given in solution diluted to four fluidrachms or 15 cc., and always on an empty stomach. Should no effect be obtained within 24 hours the intervals between the dose should be shortened, first to 4 hours, then to 3, before the dose is increased. If the commencing dose be $\frac{1}{200}$ of a grain the first intervals should be shorter, say every 3 hours. The solution should be swallowed with as little contact with the mouth as practicable if the sensation there is to be avoided. But if used for trigeminal neuralgia the mouth impression should certainly not be avoided, but should rather be sought for and be made as strong as possible.

For external use there is probably no form better or more convenient than an oleate of aconitia, made by dissolving two grains, or 130 milligrams in 98 grains of oleic acid. A fluidounce of oleic acid weighing 412 grains requires 8·25 grains of aconitia to make a 2 per cent. solution. Each minim of this oleate contains ·0172 of a grain, or about $\frac{1}{60}$ of a grain, and this quantity applied locally and repeated according to circumstances should be an efficient dosage, and should in a short time produce constitutional effects by its absorption. It should be applied to the surface by the cork of the vial, or by some non-absorbent, without friction, and about the head and face needs no covering; and great care must be taken that it does not get into the eye. In using it around the eyes this caution must never be forgotten. If applied under the clothing it should be covered with oiled silk or rubber tissue. Local neuralgias are much better reached by the dermic or epidermic method of treatment.

One hundred drops of the oleate make a fluidrachm when dropped from an ordinary half ounce vial, thus making a little more than 1·5 drop to the minim. One drop spread by a pin or by the cork of the vial will easily cover a square inch of surface without spreading much further afterward, and in ordinary conditions of the healthy skin will be absorbed within a quarter of an hour, so that the dose may be repeated on the same place.

As a general result of these trials the conclusion can hardly be avoided that a well-made fluid extract of aconite root, made by reper-

colation with alcohol alone from good root, is the best and only preparation needed. It is accurate and uniform and easy to manage accurately in dosage, and is relatively the strongest of all the known forms in which the drug can be used. For these and many other reasons it should take the place of all the other preparations, and perhaps also that of all the aconitias.

Each parcel of it as bought by the pharmacist or the physician should be tested, and if one-tenth of a minim of it diluted with a fluidrachm of water and held in the mouth for one minute does not give the aconite impression within ten minutes, the parcel should be rejected, or its strength should be obtained, and doses increased accordingly.

That is, if double this quantity in the same dilution should be required to give the slight but distinct impression, then the dose should be doubled.

It is best used at the bedside in the following way: A household teaspoon is called for, and ten teaspoonfuls of water are measured with it into a wine-glass or small cup. Then ten minims of the fluid extract are added from a minim pipette, and the mixture is well stirred. A teaspoonful of this represents a minim of the fluid extract, if measured with the same spoon, and this dose, if not given oftener than every three hours, will about use up the mixture in the 24 hours, until the next visit, when a fresh mixture should be made, and the dosage varied according to circumstances. The teaspoonful dose should be put in a wine glass, and about two teaspoonfuls of water added before swallowing, to avoid too strong an impression upon the fauces. A mouthful of water immediately after the dose is also useful in moderating the local impression.

The fluid extract may also be efficiently used externally by allowing successive drops to evaporate from any surface until the desired dose is reached, and then keeping the surface moist, that absorption may take place.

This fluid extract, when of good quality, is an exceedingly potent preparation, and so dangerous that extreme caution is needed, not only in its use, but also to prevent accidents and mistakes. In prescriptions the full title, "Fluid Extract of Aconite Root," should always be used.

SOME RESULTS OF THE ACTION OF THE DIGESTIVE FERMENTS UPON DRUGS.

By George Brownen, F.C.S.

Read before the British Pharmaceutical Conference.

I purpose in this paper to call the attention of this conference to some of the results of the action of solutions of the digestive ferments upon medicinal substances.

Preparations containing the gastric and pancreatic ferments have recently become famous as dietetic auxiliaries; I need not, therefore, occupy time with references to peptonized foods or drinks, or even give a detailed account of their discovery and development.

In 1836 Schwann applied the term pepsin to an albumen-dissolving product obtained from the gastric juice, and subsequent investigations seem to show that the gastric juice contains more than one distinct ferment, or that this ferment may be modified by the process of extraction, so as to assume new or lose some of its original properties. This is also true of the ferment or ferments of the pancreas. Bouchardat, in 1845, and Claude Bernard, a few years later, discovered or described some of the properties of the pancreatic secretion. In 1862, Danilewsky asserted the existence of three special ferments in the pancreatic juice, and since that time Von Wittich, Kuhne, and others have extracted and examined the ferments and applied them to dietetic purposes.

But there is a field of research outside the range of the peptonized foods which merits the attention of the pharmacist and the physiologist. It is this, what are the possible modifications which drugs may undergo in contact with the digestive secretions, and will an examination of such results be of service in the preparation, combination or preservation of crude material so as to secure the best physiological results?

Solutions of the gastric ferment were obtained from the stomach of the pig, by means of dilute glycerin and also with acidulated water and alcohol. Pancreatic solutions were also obtained from the pancreas of the pig by means of glycerin and a feeble alkaline, as well as an acidulated dilute alcohol. The first series of experiments were made with these solutions and crude drugs; the second with the definite principles.

An infusion of rhubarb, half ounce to the pint of water, was pre-

pared, and as soon as the infusion had cooled to 50°C., some of the acid solution of pepsin was added and the temperature maintained by means of the incubator for two hours; 47 per cent. of the rhubarb was thus rendered soluble. The mixture was then neutralized by sodium carbonate, the alkaline solution of pancreatin added, and the temperature sustained for two hours longer. The insoluble portion was then found to consist of cellulose and earthy salts, retaining a small quantity of coloring matter. The 240 grains of rhubarb left an insoluble residue of 96 grains.

Infusion of calumba, prepared with boiling water, and passed through the same processes of digestion, gave somewhat similar results. The spongy cellulose was associated with a trace of berberia; 500 grains of calumba left an insoluble residue of 172 grains.

Cinchona and opium, upon the other hand, behaved somewhat differently; the gummy and extractive matters were dissolved and retained in solution, but a considerable portion of the alkaloids was left in the insoluble marc. Cinchona was about half soluble (48 per cent.), and opium about two-thirds, or 68 per cent. Quinine and morphia could be detected in the respective solutions and were also readily found and extracted from the insoluble residues. The cinchona tannin was destroyed in the digestive process and failed to precipitate gelatin, but this peculiarity will be noticed when we come to the action upon definite substances.

The possibility of the digestive ferments attacking gum acacia was deemed of some importance, in consequence of gum being used in a test demonstrating the acidification of fat by the emulsive ferment of the pancreas. Strong solutions of white gum arabic were therefore prepared and submitted in the incubator to the action of the gastric and pancreatic solutions. The feebly acid solution containing the gastric ferment remained clear even after several hours' digestion. A slight change, however, had occurred in the mixture, as a portion removed, neutralized with soda and boiled with Fehling's sugar test, showed a slight reduction to cuprous oxide, whereas a portion of the original solution undigested, but kept at the same temperature and under similar conditions, was not affected by the glucose test.

The mucilage digested with the alkaline pancreatin solution soon became cloudy, and ultimately a white precipitate was formed. The mixture seemed less viscid than that containing the gastric ferment, and a portion of the solution gave the violet reaction of peptone. The

precipitate was found to consist of calcium carbonate, with a considerable quantity of the diastastic ferment carried down by the precipitated chalk. This precipitate, carefully washed, was found to possess strong amylolytic but no proteolytic or emulsifactive power.

I should, therefore, think that the arabin of gum acacia remained unaffected by the processes, and that the peptonizing change was wrought upon some slight impurity of gum, possibly containing nitrogen; this point, however, is reserved for further investigation.

Closely allied in physical character to gum, and holding an intermediate place between foods and medicines, are the mucilages obtained from Irish and Iceland moss. On Irish moss the alkaline extract of the pancreas seemed to exert very little action. The proteolytic ferment of the pancreas extracted with acids soon destroyed the viscidity of the mucilage, and divided the jelly into soluble and insoluble portions. These results were also obtained by the digestion of chondrus jelly with solution of pepsin; the products resembled and perhaps were identical with parapectin and pectic acid.

Cetraria, or Iceland moss, behaved somewhat differently. A jelly of this substance retained its color, but became flocculent when acted upon by the gastric ferment. On the other hand, the pancreatized jelly retained more of its viscidity, became deeper colored, and gave a deposit of yellowish-white flakes. These flakes under the microscope were found to consist of noncrystalline masses (pectic acid ?).

The digestives were found to produce or accelerate the pectic fermentation by some experiments upon the pectin of the turnip.

I must now leave the consideration of this part of my subject and call your attention to the action of the ferments upon more definite substances. The acidulated extract of the gastric juice decomposed a watery solution of salicin very slowly and imperfectly; saliretin was formed, but it was associated with undecomposed salicin. On the other hand, the pancreatic ferment split up the salicin into saligenin and glucose, and the saligenin separated by solution in ether and subsequent crystallization was obtained in the form of white laminæ or scales.

A well-washed sample of jalapin remained intact after digestion with the pepsin solution, but pancreatic digestion withdrew a copper-reducing substance from the jalapin.

Santonin was unaffected by gastric and pancreatic solutions.

A solution of tannin treated with the acid pepsin solution became

turbid, but the turbidity disappeared when a little more hydrochloric acid was added to the mixture. The results of several hours' digestion were, however, negative, but the pancreatic ferment, upon the other hand, rendered the tannic acid incapable of precipitating gelatin or isinglass, because of the transformation into gallic acid.

These are a few of the results obtained by digesting drugs with extracts from the digestive organs; they throw open a wide field for the pharmacist, and one deeply interesting to the physiologist.

The digestive process seems to consist of the hydration or splitting up of insolubles, and, as far as my observation has gone, the microzymous or bacteroidal fermentation need not occur until the primary digestion is in an advanced stage. For instance, in the digestion of the proteids, albumen and fibrin, I have noticed occasionally a point when the solution or hydration of these substances by the acidulated pancreatic secretion passes into the formation of leucin and tyrosin. I refer to the acidulated pancreatic solution, as the researches of Dr. Roberts and others upon the amylolytic power of a neutral or feebly alkaline pancreatic extract have seemed to throw into the shade the proteolytic power of acidified pancreatic juice, which, although incapable of transforming starch paste into sugar and dextrine, yet still possesses the power of dissolving fibrine or albumen, and ultimately splitting them up into leucin, tyrosin, and an organic acid. This is not the result of the putrid fermentation of albuminous bodies, as in this latter case the formation of ammonia renders the reaction alkaline instead of acidulous.

The emulsive ferment as well as the proteolytic inaction produces acidity, although in the emulsification of fat the acidity is generally very slight and insufficient by itself to account for the minute subdivision of large portions of fat. In the digestion of proteids the acidulous body is glutamic acid, and I think it may also occur in the emulsification of fats, as I have often sought for fatty acid and glycerin as separate bodies in emulsified fats; but I have always failed in my attempts to obtain any proportionate quantity which would justify me in ascribing emulsification of fat to their formation and presence.—*Phar. Jour. and Transactions.*

Compound Cathartic Pills.—The following slight change in the formula for *Compound Cathartic Pills,* U. S., is strongly recom-

mended, on account of its rendering them less drastic, and more cholagogue in their action. It has been thoroughly tested in this part of the country, and is found superior to the U. S. formula in every particular, and I respectfully suggest it for consideration by the revisors of our standard. In this the calomel is increased and the gamboge diminished, as follows:

℞ Ext. coloc. comp.,			
Calomel,	āā	gr. $1\frac{1}{3}$	
Ext. jalap,		gr. 1	
Gamboge,		gr. $\frac{1}{5}$	M.

J. Dabney Palmer.

Monticello, Fla., Sept. 28, 1882.

THE CONSTITUTION OF ALBUMENOIDS.

The following passages are taken from an interesting report upon albumenoid matters which has recently been presented by M. Dumas to the Academy of Sciences, based upon a communication from M. Béchamp.

Among the most interesting and least known of organic substances are those which are designated under the common name of albumenoid or gelatinigenous matters, which are either liquid and coagulable, as white of egg, blood serum, and the fibrous principle of the flesh of animals, or tissues that may be converted into gelatin, as well as gelatin itself. Not being volatile or crystallizable they are most difficult to define, and just as it might be believed that we had to do with a well characterized species the substance proves to be a mixture of two or more different bodies.

The distinctive specific properties of these bodies are therefore not yet well known; there are obscure points in respect to their elementary composition; the products resulting from the action of energetic reagents upon them are complex, whilst all the formulæ by which it has been attempted to represent their composition have proved so complicated that it is difficult to lay hold of the bond connecting them with the ordinary equations of organic chemistry which have been studied with success in recent years. Such considerable efforts have, however, been made, and science has been for some time past enriched with results so worthy of attention, that the not very distant discovery of the true constitution of these substances—which appear to be direct

instruments of life—may be considered possible and even probable, as well as the precise definition of their specific constituents.

Although these matters do not crystallize or volatilize or form well-defined combinations with bases or acids, they possess one character which is constant and distinctive, and that is the action that bodies of this nature exercise upon the plane of polarized light. In studying various albumenoid matters under this aspect M. Béchamp has succeeded in separating them into species which, if not absolutely defined and comparable to those represented by volatile or crystallizable substances, at least present the results of the first serious attempt towards a regular classification of these interesting products.

In order to appreciate the importance of this inquiry it is sufficient to recall the fact that the organs of all animals and the liquids bathing them are formed of or contain such matters, and that if they do not constitute the preponderating materials in the tissues and juices of plants, their presence in them does not seem to be less general or less essential, especially at the commencement of cell formation. If it be added that analyses of these substances and their interpretation have led chemists to admit that their molecule contains not less than from five to six hundred atoms of carbon, hydrogen, oxygen, or nitrogen, it will be understood what a distance separates these bodies from those much less complex ones, the study of which has served as a foundation for the doctrines upon which systematic organic chemistry rests.

The first question to resolve in connection with this group of bodies consists in breaking up the mixtures in which they occur in nature and isolating those individuals possessing fixed and sufficiently fundamental properties to warrant their being considered specific and essential.

White of egg contains at least three bodies: one precipitable by subacetate of lead; a second by ammoniacal subacetate of lead; and a third which is not coagulable by heat, and is soluble in water and insoluble in alcohol, by which means it is separable from an aqueous solution. The first two of these substances present the general character of albuminoid matters; the third belongs to the class of ferments and liquefies starch.

The ferment discovered in the white of egg by M. Béchamp explains some of the phenomena which occur during incubation. Its presence there caused him to look for it in other albuminoid products, and a general idea of his work may be given by saying that he has suc-

ceeded in breaking those up into two or three distinct substances, possessing the properties of albuminous products, and a well-defined ferment. The question arises, for what purpose are all these albuminous liquids accompanied by these ferments? What relation exists between the abundance of coagulable animal matter, destined apparently to furnish materials for the building up of organs, and the small quantity of these ferments the presence of which appears to indicate the approaching destruction of the unstable compounds with which they are associated? Whence do these ferments come, what becomes of them, and what part do they play? Such questions are certainly of considerable interest; for these ferments are observed in the serum of the blood of all animals, in the white and the yelk of eggs, and in milk; that is, in all liquids destined for the formation or reparation of the organs of animals.

Long ago Thenard, recognizing the singularly destructive action exercised upon peroxide of hydrogen by certain bodies, such as divided silver, was led to compare their manner of action in this case with that of ferments. In fact, the analogy is striking between beer yeast, which in the presence of sugar destroys it and converts it into alcohol and carbonic acid, and fibrin, which converts peroxide of hydrogen into oxygen and water. Neither beer yeast nor fibrin appears to operate in virtue of a chemical action, or it would have a part to play. But yeast operates in virtue of a vital phenomenon: would this be the case with fibrin? Of this we are ignorant, and although our ideas upon the subject of ferments have been much modified since the investigation of peroxide of hydrogen by Thenard, we are not yet in a position to explain how fibrin decomposes peroxide of hydrogen apparently without borrowing anything from it or yielding anything to it.

This question, the interest of which has not escaped physiologists, has been advanced a step by M. Béchamp. The fibrin of the blood and the oxygen condensed in the globules may possibly have a part to play in the complex phenomena of respiration allied to this singular action upon peroxide of hydrogen which no other animal matter exhibits. M. Dumas states that he himself formerly sought unsuccessfully to ascertain whether arterial blood contained peroxide of hydrogen, but he would not be surprised if some more able experimenter were to detect its presence.

When fibrin is treated with dilute hydrochloric acid it swells and

the greater portion of it dissolves; but as recognized by M. Bouchardat there is always an insoluble residue. M. Béchamp has demonstrated that it is in this residue that the decomposing action in respect to peroxide of hydrogen is found and not in the soluble portion that is removed by hydrochloric acid.

The granular substance insoluble in hydrochloric acid is still an albumenoid matter, possessing the general properties of albumenoids. When heated to boiling in water it loses its decomposing power upon peroxide of hydrogen. If dried in a vacuum in the cold it, on the contrary, retains the power. The same happens when it is treated with alcohol and ether; a little fatty matter is removed without modifying its decomposing power. When this singular substance has been well prepared its action upon peroxide of hydrogen is as rapid as that of the metallic oxides.

It may be mentioned that in a subsequent communication to the Academy ("Comptes Rendus," xciv, 1382) Messrs. Bert and Regnard confirm M. Béchamp's statement that the power of decomposing peroxide of hydrogen resides in the portion of fibrin not dissolved in dilute hydrochloric acid. They further state that if fibrin be converted into peptone by artificial digestion it is no longer capable of decomposing peroxide of hydrogen, but that this property is not affected by putrefaction. Another observation of these experimenters that in every case an organized ferment, such as beer yeast, is immediately destroyed by contact with peroxide of hydrogen, whilst soluble ferments, such as diastase and the gastric and pancreatic juices, are not affected by it, may give a clue to the nature of the ferment associated with fibrin.

The memoir of M. Béchamp contains the results of his attempts to separate definite substances from various albumenoid matters, and enumerates the various ferments that he has found associated with them as well as their properties.—*Phar. Jour. and Trans.*, July 22, 1882; from *Journal de Pharmacie.*

THE VOLATILE PRODUCTS OF PUTREFACTION.

By Dr. G. Le Bon.

In a paper recently laid before the French Academy, the author states that as the result of his latest experiments on the antiseptic pro-

perties of the glyceroborates of sodium and calcium he comes to the following conclusions:

First—The disinfecting power of any antiseptic is in inverse ratio to the age of the putrefying material. A solution of chopped meat six days old will require a much smaller proportion of disinfectant than when it has been kept, say for a couple of months, when the amount required will be ten times greater.

Secondly—If we wish to measure the power of antiseptics by taking as a basis their disinfecting properties, when applied to a solution of chopped meat of normal strength (1 : 10), we shall find that the most powerful compounds are potassic permanganate, calcic hypochlorite, ferrous sulphate acidulated with acetic acid, carbolic acid and potassic and sodic glyceroborate. For instance, in order to disinfect 10 cubic centimeters of the normal chopped meat solution mentioned above we must take 500 cubic centimeters of a saturated solution of salicylic acid, 80 of a saturated solution of carbolic acid, 80 of a ten per cent. solution of sodic glyceroborate and several drops only of a one per cent. solution of potassic permanganate.

Thirdly—There is no parallelism in the disinfecting action of an antiseptic and its action on microbes; potassic permanganate, for instance, although a most powerful disinfectant, exercises no power whatever on these organisms. On the other hand, alcohol, which, after a long time, checks their development, only acts as a very weak disinfectant.

Fourthly—There is no parallelism between the power of an antiseptic in preventing putrefaction and its power of checking it when once set up. Alcohol and carbolic acid, which are powerful preventatives of putrefaction, act but feebly when putrefaction has once commenced. Carbolic acid, therefore, when used in surgery, acts rather as a preservative than as an antiseptic.

Fifthly—With the exception of a very small number of bodies, such as corrosive sublimate and other powerful poisons, the greater part of the antiseptics now in use, more especially carbolic acid, have but a very feeble action on bacteria. If we mix 20 cubic centimeters of the above-mentioned normal solution of chopped meat with 50 or even 100 cubic centimeters of a saturated solution of carbolic acid, the larger bacteria are rendered motionless, while the smaller ones retain their vitality and powers of reproduction. The author possesses carbolized solutions four months old still rich in bacteria. In

fact, so far from looking on carbolic acid as a destroyer of bacteria, the author looks on it as the best material for preserving their lives!

Sixthly—The experiments hitherto made upon the cadaveric alkaloids have not solved the question as to whether the odorous volatile alkaloids evolved during putrefaction are poisonous or not, seeing that the products of putrefaction introduced into the body in these experiments contain bacteria to which the resulting poisonous effects may or may not be attributed. After trying many experiments, the author simply introduced a number of frogs into a vessel the bottom of which was covered with a layer of the normal meat solution already mentioned. When putrefaction first set in, although large quantities of sulphuretted hydrogen and other fetid products were evolved and the liquid swarmed with bacteria, the frogs did not seem to suffer in the slightest degree, although, had an infinitesimal portion of the liquid been injected into an elephant, the animal would infallibly be poisoned. The same liquid kept for two months and then being harmless when injected subcutaneously, killed the frogs in a few minutes when they were compelled to breathe its vapor. There is, therefore, no parallelism between the toxic properties of a putrefying liquid and of its emanations. On the contrary, they seem to be in inverse ratio; that is to say, the newer the liquid the more toxic it is, the older the liquid the more toxic are its exhalations.

Seventhly—The small quantity of these volatile toxic alkaloids, which is sufficient to kill animal life when breathed, shows them to rival nicotine, prussic acid and other powerful poisons in their virulence.

Eighthly—The author's experiments show why accidents have arisen when bodies have been exhumed after having been buried for a long time. The air of old cemeteries, although nearly free from microbes, is, nevertheless, extremely poisonous. The volatile products of putrefaction generated by microbes appear, therefore, to play an important part in contagious and infectious diseases.—*The Chemists' Journal*, from *Comptes Rendus.*

VARIETIES.

OLEATES IN THE DERMATOSES.—Dr. Shoemaker read a paper at the recent meeting of the Pennsylvania State Medical Society, in which he claimed the following advantages for the oleates over ordinary ointments:

First: Their deep penetration. The oleic acid gives them active ability to penetrate rapidly into the animal economy, and renders any salt with which it is combined more active and effective in dermic medication. Second: Their freedom from rancidity. Third: Their cleanliness of application. Fourth: Their great economy. Fifth: Their antiseptic action. Oleate of zinc is of great value in hyperidrosis and osmedrosis and eczema vesiculosum. Oleate of copper is of great value in tinea. Oleate of alumina is of great value in checking muco-purulent discharges. Oleate of iron has a mild astringent action. Oleate of arsenic is of value in lupus and the ulcerating variety of epithelioma, and is better borne than other forms of arsenic. The surface must first be abraded, otherwise there is no result. Oleate of silver is of value as a local application in erysipelas, and when sprinkled over old chronic ulcers sets up a healthier state of the parts. It is of use in carbuncles and boils, and will often arrest pustulation in its earlier stages.—*Chicago Medical Review*, June 1.

The Proper Dose of Conium.—Seguin ("Archiv. of Medicine," April, 1882), commenting upon the dose of this agent (he employs the fluid extract, Squibb), says that to get any effect from it we must use much larger doses than are usually recommended. He says use it in chorea, spasm or paralyzed limbs, general irritability and insomnia. To obtain muscular relaxation, as in chorea, after a few tentative doses of 20 and 40 minims, he gives 60, 80 or even 100 minims, which cause ptosis (sometimes diplopia) and paresis of arms and legs. He does not repeat until the effects have passed off—12 to 24 hours. He has almost perfectly cured a chronic adult chorea of 14 years' duration by teaspoonful doses daily for a month or more. Many cases of insomnia with wakefulness in the first part of the night, more especially those with fidgets or physical restlessness, are very much benefited by conium—m. xx with gr. xx bromide of potassium, to be repeated if necessary. The indications of conium can only be fulfilled by obtaining its physiological effects, between which and the toxic effects there is a wide difference.—*Md. Med. Jour.; South. Med. Record.*

Bromide of Potassium in Diabetes.—The Paris correspondent of the "Medical Press" says: "Before the meeting of the Académie de Médicine a member read a paper on the treatment of diabetes by bromide of potassium. For the last six years the author has made this disease the object of his researches, and during that period he treated fifteen cases. He ignored entirely the classic *régime* of gluten bread, etc., being of the opinion that the disease consisted, not in the presence of sugar in the urine, but in the disorder of the organism, which produced the sugar in excess. Having had a patient that was diabetic, but who consulted him for certain nervous affections, he observed that under the influence of the bromide of potassium, of which he prescribed a drachm a day, the former disease yielded. Ever since, the author has entirely adopted this drug in the treatment of the disease in question, and always with good results. The author farther insists on the necessity of employing muscular exercise of every kind. Alkalies, iron, arsenic, quinine, according to indications, form part of the general treatment. One point worthy of remark in the communication is the complete disregard as to *régime*."—*Louisv. Med. News*, Oct. 28.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, October 17th, 1882.

In the absence of the President Mr. Wm. J. Jenks was called to the chair. The minutes of the last meeting were read and approved.

Professor Maisch presented the third volume of the Index Catalogue of the Library of the Surgeon General's Office, also a copy of the Report of the Ohio State Pharmaceutical Association.

The Registrar also presented a copy of the Report of the National Board of Health, a copy of the reports of the U. S. Naval Observatory on the Total Eclipses of July 29, 1878, and January 11, 1880, and Part Second of the Medical and Surgical History of the War of the Rebellion. This is also issued from the office of the Surgeon General. These were accepted and the thanks of the College returned.

Professor Maisch alluded to a paper which he read on *Chia* last April. Since that time he had grown several plants, one of which he exhibited; he had devoted some time in examining the plant, and would continue his investigation. For the present he would state that while it was doubtless a salvia it was neither S. hispanica nor S. Columbaria, and that it came nearer to S. polystachya, but in several respects differed from the descriptions given by Kunth and De Candolle. A dissected flower was exhibited under the microscope, and Prof. Maisch explained by sketches the manner in which fertilization by insects takes place in this plant, exhibiting also the handsome plate by Prof. Dodel-Port, illustrating the same process in Salvia officinalis. Prof. Maisch also stated that he had learned that flea seed, the seed of Plantago Psyllium, was sold as Chia seed in some parts of Texas.

Dr. A. W. Miller had been interested in this exposition of fertilization, and referred to a communication made some time ago to the Academy of Natural Sciences by Mr. Meehan, who, after vainly trying to raise from the fruit of the *wild carrot* plants having the characters of the cultivated carrot, concluded that possibly the purple central flower of the umbel might yield a different fruit; since this flower is always barren in this country, he had applied to the late Mr. Darwin and learned from him that in England it frequently produced fruit. It seemed therefore possible that from this fruit a somewhat different plant might be raised.

Prof. Maisch stated that in Germany the purple central flower of the carrot umbel was, as a rule, barren, the same as in this country. The variations observable in plants under cultivation and under the influence of different climates, soils, etc., were alluded to, resulting in the production of varieties having constant characters, and in the course of time of distinct species; thus the *German pellitory*, which is nowhere found wild, is now by some botanists regarded as a new annual form produced in cultivation during several centuries from the perennial Anacyclus Pyrethrum.

Dr. Miller considered this interesting, as it had a bearing on the subject of the development theory.

Specimens of *Cotoin* and *Para Cotoin* were presented to the Cabinet by Mr. Chas. Bullock, and were accepted with thanks.

On motion of Dr. Miller, Dr. Formad was invited to lecture at the next pharmaceutical meeting upon his researches on bacteria and upon the bacillus tuberculosis of Dr. Koch, of Berlin. It was also decided that the meeting be advertised on Saturday preceding the day of the meeting and on the day of the meeting, that the pharmacists and druggists of Philadelphia and Camden be notified by postal cards of Dr. Formad's lecture, and that those who desire similar notices in the future leave their names with the Actuary.

A specimen of *Citrine ointment* made from butter by Mr. Redsecker, of Lebanon, Pa., was exhibited; its fine color and consistence was remarked. In a note it was stated that in the store of G. Ross & Co. it had thus been made for over twenty years, and had always given satisfaction. Professor Maisch said that in a store where he was engaged in 1855 the ointment was made with butter, and retained its handsome color; but it became hard enough to be run into paper moulds and cut into square cakes, in which condition it was sold.

A specimen of *Fennel seed*, grown in Lancaster county, sent by Mr. Chas. A. Heinitsh, was exhibited; though smaller than some varieties of fennel, it was of excellent odor and appearance, yet, as Mr. Heinitsh stated, not quite equal to the product of other years.

A specimen of *Alexandria Senna* was shown, and Prof. Maisch stated that it was interesting from the total absence of stalks and of argel leaves, and from its consisting of leaflets of Cassia acutifolia, mixed with a very small proportion of small leaflets of C. elongata, and a minute proportion of those of C. abovata, the admixtures being too insignificant in quantity to regard them as having been intentionally made. Mr. Jenks said that it was a good quality of garbled Alexandria senna, and that in other similar lots he had never noticed the absence of argel leaves, nor the presence of the leaflets of the other species.

It was moved, and carried, that the meeting adjourn.

T. S. Wiegand, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The Colleges.—In the beginning of October the lectures have commenced in all the Colleges of Pharmacy from the Atlantic to the Mississippi, and as far as heard from they appear to be well attended. The Philadelphia College has a larger class than during the preceding year. Improvements have been made during the past summer in the lighting and ventilation of the lecture rooms; the cabinet has been enlarged and the material for instruction has been considerably augmented, embracing not only typical and commercial specimens, but likewise apparatus, models, plates, lan-

tern-slides, etc. The auxiliary instruction has also been extended and improved. The work in the chemical laboratory, in charge of Prof. F. B. Power, has considerably increased. A goodly number of students have availed themselves of the facilities offered for individual study, and the class instruction for the senior students is meeting with encouraging success, while the more elementary course arranged for the juniors is not as well attended as it should be. The pharmaceutical laboratory, in charge of Prof. J. P. Remington, in which the hours for instruction have been doubled, as compared with previous years, is well filled so that some difficulty has been experienced for making suitable provisions for all applicants.

After several years' labor the Alumni Association has succeeded in making the necessary arrangements for practical instruction in the use of the microscope; a number of Zentmayer's instruments have been purchased and the instruction has been placed in charge of A. P. Brown, Ph.G., whose practical knowledge of microscopy and vegetable histology will be of great advantage in the more general introduction among the students of this College of the microscope as one of the important aids in study and research.

Chemical laboratories are at present in operation in all Colleges of Pharmacy, we believe. Of the organization of pharmaceutical laboratories outside of Philadelphia we have thus far been informed that it was done in St. Louis, though we are aware that the same has been and is in contemplation in several others.

The Alumni Association of the Philadelphia College of Pharmacy held its first social meeting on the afternoon of October 10th, and was addressed by Dr. Miller on the "Allurements of Pharmacy;" the speaker contended that without expensive advertisements and traveling salesmen, that absorb a large share of the profits of the wholesale druggist the legitimate business in pharmaceutical articles and druggists' sundries should be just as great as at present, and that the saving in expenses would result to the advantage of the retailer. In the discussion which followed attention was drawn to the fact that by reliable salesmen a business could be enlarged, new articles readily introduced, etc., and that without such means it would be difficult to obtain new customers as the older ones died or went out of business.

Mr. Sayre addressed the meeting on the "Use of Ammonia in Baking Powders," explained its action and that of other chemical mixtures, and contrasted this with the old-fashioned leavening.

Dr. Miller exhibited a specimen of crystals which had been obtained in the distillation of cedar shaving, and which may possibly be a stearopten The attacks of "the press" on pharmacists and some points in relation to urinary analysis formed further subjects for discussion.

The Illinois Pharmaceutical Association held its third annual meeting in the armory of the First Regiment, in Chicago, October 10th, 11th, and 12th. The chair was occupied by President Bourscheidt; the

Secretary's desk by T. H. Patterson. Addresses of welcome were made by City Engineer Cregier, on behalf the Mayor, and by Lieutenant-Governor Hamilton. The annual address of the president, and the reports of the other officers, of the various committees and of the State Board of Pharmacy were read and appropriately disposed of. The draft of a law for the regulation of the sale of alcoholic liquors for medicinal purposes was submitted and referred to the Committee on Legislation.

Papers were read by Prof. Hayes on the "Therapeutic value of Electricity;" by A. G. Vogeler on "Citrine Ointment;" also, one entitled "Whither are we Drifting?"; by C. S. Hallberg on "Ergot," and several papers by H. Biroth.

The following officers were elected to serve for one year: President, Henry Biroth, Chicago. Vice-Presidents, I. H. Le Caron, Braidwood; E. Smallhausen, Lawrenceville; J. B. Boyd, Quincy. Permanent Secretary, T. H. Patterson, Chicago. Treasurer, W. P. Boyd, Arcola. Executive Committee—Thomas Whitfield, Chicago; L. Van Patten, St. Charles; Victor H. Dumbeck, Peoria.

After the transaction of routine business and electing Mr. H. Fleury Local Secretary, the Association adjourned to meet next year in Springfield, on the second Tuesday of October.

The meeting was well attended, various places of interest were visited, and a banquet at the Grand Pacific Hotel was provided for a large number of guests.

EDITORIAL DEPARTMENT.

Charges against Pharmacists.—In our September number, page 474, we alluded to sensational attacks made by a newspaper of this city upon the integrity and trustworthiness of the pharmacists of Philadelphia, and stated that the Trade Association of Philadelphia Druggists had requested to be furnished with proofs of the charges made. This proof has at last been forthcoming and was submitted to a meeting held October 9th. From the report of the committee and the appended documents, it appears that Dr. Leffman had been engaged to analyze sixty-five medicines procured at different drug stores, the large majority being presumably those upon whom the suspicion of adulteration and substitution rested. In one case sulphate of cinchonidine had been substituted for sulphate of quinine, and in another case a mixture of borax and tannin had been dispensed as boracic acid. These are the only two cases of actual fraud that were clearly proven; for the dispensing of sulphate of eserine in place of hydrobromide of eserine was certainly not a frand, though the manner in which the error or inaccuracy occurred has not been explained.

In addition to these cases, a great deal of capital was sought to be made by the newspaper from the analysis of several samples of tincture of opium, which appear to have been purchased as laudanum, and not to have been obtained upon prescriptions. The laudanum procured from a reliable wholesale house was taken as the standard of comparison; it yielded 4·6 grains of morphine to the ounce. The Pharmacopœia of 1870 requires dried

opium to contain 10 per cent. of morphine, and since a fluidounce of tincture of opium represents 37·5 grains of opium, it should contain 3·75 grains of morphine; the standard selected was therefore ·85 grains = 22·7 per cent. stronger than the minimum strength permitted by the Pharmacopœia. It will thus be seen that those samples which were reported to have been 20 and 25 per cent. below the standard sample were fairly within the limits and intention of the Pharmacopœia. The same cannot be said for a few samples which were reported to have yielded 40 to 50 per cent. less morphine than the standard sample; but whether this was really fraudulent dilution has not been explained. It is well known that certain pharmacists always sell at retail laudanum diluted with one-half or an equal bulk of diluted alcohol, with the view of lessening the danger of serious mistakes on the part of the consumer. Years ago we have pointed out the error of this view, and the injustice thereby done to those pharmacists who not only in the dispensing of prescriptions, but also in the retail sales, adhere strictly to pharmacopœial strength; but our opposition to this practice does not prove its non-existence, nor lessen the good faith—mistaken though it may be—in which it is kept up by a few, and until the contrary has been shown we prefer to take this view of the laudanum cases, instead of regarding them as fraudulent sophistications.

The whole crusade dwindles down to two cases of fraud, surely a grand result of the continuous vituperation extending through several months, and this was announced by the newspaper in question, in large type headings, as "the charges substantially sustained," and "substitution fully proven." It is the intention of the Trade Association to prosecute the above cases of fraudulent substitution. But a result, which was not looked for is this, that after diligently searching for cases of substitution and adulteration such an insignificant number only could be found, in a city where it is estimated that daily about 4,000 prescriptions are dispensed; we think it should be a lesson to those who waste their time in accusations of unlimited frauds committed by pharmacists and druggists.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

On Asthma; its Pathology and Treatment. By Henry Hyde Salter, M.D., F.R.S., etc. First American, from the last English edition. New York: Wm. Wood & Co., 1882. 8vo, pp. 284.

Nearly two-thirds of the volume is taken up with the pathology, clinical history, ætiology, diagnosis, prognosis and treatment of the different forms of asthma; hygiene, diet and the various remedial agents are fully considered, but amongst the latter we have noticed the absence, at least from the index, of several remedies which have been used in this complaint with more or less success, such as amyl nitrite, eucalyptus, grindelia, jaborandi and others. The appendix gives a full history of fifteen selected cases, and in tabular form the history of 223 cases, nearly all of which had come under the author's personal observation, doubtless an addition of great value to the physician.

The volume is published as one of the current series of the Library of Standard Medical Authors.

Nitroglycerine as a Remedy for Angina pectoris. By Wm. Murrell, M.D., M.R.C.P., etc. Detroit: Geo. S. Davis, 1882. Small 8vo, pp. 78. Price, $1.25.

After giving a brief chemical history of nitroglycerin, the author proceeds to describe its physiological action upon animals and man, and then relates his experience with it in the treatment of angina pectoris, in which disease it proved to be of decided service. The remedy is used in the form of the one per cent. alcoholic solution, which is preferable to the solution in ether, and is given diluted with water or peppermint water, sometimes in connection with a little spirit of chloroform. It may also be made into pills or tablets. The commencing dose of the solution is about one minim, but occasionally persons are affected by a much smaller dose, or require a larger quantity, the object being to get the physiological effect of the drug; after a time tolerance is established and larger doses are required. Alarming symptoms, resulting from an overdose, are commonly transitory, and the patient recovers before assistance can be obtained.

The little volume is gotten up in good style, with clear type, heavy toned paper, and cloth binding, embossed in gold.

The Physician's Visiting List for 1883, for 25 Patients per Week. Philadelphia: P. Blakiston, Son & Co. Price, $1.

This is the thirty-second year of the publication of this visiting list.

Handwörterbuch der Pharmacognosie des Pflanzenreichs. Von Prof. Dr. G. C. Wittstein. Breslau: Eduard Trewendt, 1882.

Dictionary of Pharmacognosy of the Vegetable Kingdom.

The third part of this valuable work contains the articles in alphabetical order from Gurgunbalsam to Kornblume. The statements made of two North American drugs need slight corrections: Kalmia latifolia was found by Kennedy (1875) to contain arbutin, and gelsemine was isolated by Kollock in 1855; although physiological experiments have been made with this alkaloid we are not aware that it is therapeutically employed.

Proceedings of the Third Annual Meeting of the Iowa State Pharmaceutical Association, held in Des Moines, Tuesday and Wednesday, February 14 and 15, 1882. Iowa City. 8vo, pp. 178.

Proceedings of the Pennsylvania Pharmaceutical Association at its Fifth Annual Meeting, held in Altoona, June 13, 14, 1882. Harrisburg. 8vo, pp. 184. Price, 75 cents.

Proceedings of the Fifth Annual Meeting of the Kentucky Pharmaceutical Association, held in Covington, May 17 and 18, 1882. Louisville. 8vo, pp. 72.

The meetings of the above associations have been noticed on pages 204, 381 and 428 of our present volume. The Proceedings of the Iowa Association contains a good lithographic portrait of the second President, G. B.

Hogin, and through the printed minutes over a dozen of advertisements are scattered, appearing as parts of the minutes. The Proceedings of the Pennsylvania Association contains the proposed pharmacy law, as revised by the committee, in accordance with the suggestions made at the meeting.

Essentials of Vaccination; a Compilation of Facts relating to Vaccine Inoculation and its Influence in the Prevention of Small-pox. By W. A. Hardaway, M.D., Professor of Diseases of the Skin, in the Post-Graduate Faculty of the Missouri Medical College, at St. Louis, etc. Chicago: Jansen, McClurg & Co., 1882. 8vo, pp. 146. Price, $1.

While this little volume does not profess to be a comprehensive treatise on vaccination, it will be nevertheless welcomed as embracing and sifting from the extended literature on the subject the main and important facts relating to its history and merits, which must lead every unbiased mind to acknowledging the blessing that vaccination has been to the human race, and towards persisting in the efforts of reforming such evils as may exist, and of extending the practical usefulness of the measure, so that in the course of time the noble dream of Jenner, the total extinction of small-pox, may be realized.

OBITUARY.

Friedrich Woehler.—On the 25th of September the Atlantic cable announced the demise of this veteran chemist at Goettingen, where he had resided for forty-six years, occupying for about forty years the chair of chemistry in the university of that city, and remaining in active connection with this institution to the time of his death.

Woehler was born at Eschersheim, near Frankfort-on-the-Main, July 31, 1800, was educated at Roedelheim and Frankfort, and studied medicine at Marburg and Heidelberg, receiving the title of M.D. at the latter university in 1823. But his favorite studies were mineralogy, physics and chemistry, notably the latter science which owes to his patient and accurate researches much of its present position. While a medical student, he commenced his investigations of the cyanogen compounds, and experimented upon the secretions, through the urine, of various compounds, the latter researches proving the conversion, in the animal economy, of citrates, tartrates and similar salts of the alkalies into alkaline carbonates. The diligent and observing student soon attracted the attention of Leopold Gmelin, his teacher in chemistry, in Heidelberg, who advised him to embrace chemistry as his profession in the place of medicine. Woehler acted promptly upon this advice, worked for a year under the guidance of Berzelius and accompanied the latter upon a tour of exploration through Norway and Sweden in the summer of 1824. In the following spring he received and accepted a call as professor of chemistry to the Polytechnic School of Berlin, and in 1832 to a similar institution at Cassel, from which place he removed to Goettingen in 1836.

Woehler executed a large number of analyses of minerals, and introduced many improvements in the analytical methods. He first isolated or improved the process of isolation of many elements, like potassium, yttrium, beryllium, aluminium, tungsten, titanium, boron, etc., and elaborated a number of processes for use in pharmacy, metallurgy and the arts. He showed the difference between infusible and fusible white precipitate, the composition being determined by Kane. He discovered the dimorphism and isomorphism of the oxides of antimony and arsenic, and showed that dimorphous bodies possess different melting points in the amorphous and crystalline condition. The first instance of isomerism (polymerism) was clearly proven through the discovery of cyanic acid by Woehler in 1822, and of fulminic acid by Liebig and Gay-Lussac in 1824.

Woehler's labors in organic chemistry were not less extended and fruitful for theory as well as practice. His preparation of urea from cyanic acid and ammonia in 1828, opened the way for the production of organic compounds from inorganic material. But perhaps still greater results flowed from his labors undertaken conjointly with Liebig, who was then professor at the University of Giessen. The brightest of these researches were made during the decade 1830 to 1840, and embraced the compounds and derivatives of benzoyl, cyanogen and uric acid. Aside from the large number of new compounds discovered by the colaborers, facts like the chemical relation of oil of bitter almond to benzoic acid, the glucoside nature of amygdalin (1837), the substitution of hydrogen by chlorine and other elements, and many others opened new fields of investigation and new views, upon which could be gradually built the theoretical structure of chemistry of the present time.

The literary productions of Woehler are very numerous; his essays were published in the prominent journals of chemistry, physiology and physics of Germany, in the Transactions of the Academies of Stockholm and of Goettingen, and particularly in the "Annalen der Chemie und Pharmacie" (now "Liebig's Annalen") of which he was for many years one of the editors. He also wrote for the first edition of the "Handwörterbuch der Chemie" many of the most important articles, and from 1825 translated into German the handbook of chemistry and the annual report on the progress of chemistry by Berzelius, and other works written in the Swedish language. His little "Grundriss der Chemie" (Outlines of Chemistry) proved to be of such excellence that it passed through many editions and was translated into three or four languages. The inorganic part made its first appearance in 1831, and the organic part in 1840, and it is still in existence, though of course in a greatly modified form, being at present edited by Prof. Fittig.

As a teacher, Woehler was revered by his pupils, among whom was a large number from this side of the Atlantic; as a man he was above reproach, and as a scientist he was honored everywhere. The American Pharmaceutical Association, the Philadelphia College of Pharmacy, and other American societies lose in him one of their most valued honorary members. He survived his somewhat younger colaborer, Liebig, nearly nine and a half years.

THE AMERICAN

JOURNAL OF PHARMACY.

DECEMBER, 1882.

ON BISMUTH SUBNITRATE.

By Simon E. Wolf, Ph.G.[1]

Having learned that in a post-mortem examination bismuth subnitrate had been found in the stomach in an unchanged state, except that the particles had become covered with a thin coating of bismuth sulphide, several commercial samples of the subnitrate were examined microscopically and found to be, some of them distinctly crystalline, others amorphous. This induced an inquiry into the conditions under which bismuth subnitrate may be obtained in different forms; the results show that the precipitation of the salt is influenced by the temperature, the amount of the precipitating liquid, the manner in which the latter is added, and by its composition. It appears that analogous salts, especially the nitrates, interfere with the precipitation of the subnitrate and enable solutions of bismuth nitrate to be diluted with much larger volumes of water than when these salts are absent. For all the experiments the same solution was used, prepared by dissolving 30 gm. of bismuth subnitrate in 30 cc. of nitric acid with the aid of heat, and adding sufficient distilled water to make the solution measure 150 cubic centimeters.

Effects of Temperature.—The precipitating liquid was heated to 100°C., and 2 cc. of the solution added to it, when—

1. With 10 cc. of distilled water distinct prismatic crystals were obtained.
2. With 80 cc. of water the precipitate was amorphous.
3. With 40 cc. of water acidulated with hydrochloric acid (quantity?) no precipitate was produced.

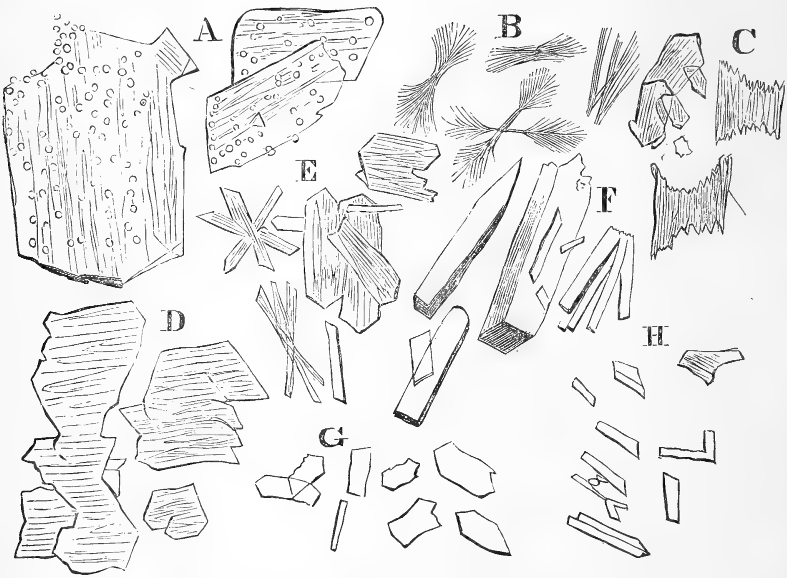
[1] The author, who graduated from the Philadelphia College of Pharmacy in March, died at Harrisburg, Pa., May 29, 1882. The above essay is a brief abstract, prepared from his graduating thesis, which contains eight carefully executed microscopic drawings from which a selection for the accompanying wood cut has been made. -Editor Am. Jour. Pharm.

Modes of Addition.—2 cc. of the solution added to 10 cc. of cold water produced—

4. On slow addition a fine crystalline precipitate.

5. On rapid addition with constant stirring, a crystalline precipitate, as illustrated in A.

6. Water was added, drop by drop, to 2 cc. of the solution, until the precipitate ceased to be redissolved; 11 cc. of water were required.



BISMUTH SUBNITRATE, magnified 120 ×.

A, from little cold water; B, in presence of KNO_3; C, in presence of $Hg_2(NO_3)_2$; D, in presence of $Ni(NO_3)_2$; E, in presence of $Pb(NO_3)_2$; F, from much cold water; G,H, commercial samples, elutriated.

Presence of Nitrates.—The liquid used for precipitating 2 cc. of the bismuth solution consisted of 10 cc. of strong solutions of the following nitrates:

7. Ammonium nitrate; no precipitate after 24 hours.
8. Potassium nitrate; feathery crystals, illustrated in B.
9. Barium nitrate; fine mica-like scales.
10. Sodium nitrate; amorphous precipitate.
11. Silver nitrate; no precipitate.
12. Mercurous nitrate; crystalline precipitate, shown in C.
13. Nickel nitrate; precipitate after 24 hours, crystals like D.

14 and 15. Calcium and magnesium nitrates; no precipitates.

16. Lead nitrate; crystalline precipitate, shown in E.

Presence of other Salts.—2 cc. of the bismuth solution added to 10 cc. of strong solutions of the following salts:

17. Calcium chloride; 18. Sodium sulphate; 19. Manganese chloride; 20. Citric acid; no precipitates.

20. Sodium thiosulphate; black precipitate, probably due to reducing action.

21. Potassium acetate; copious amorphous precipitate.

22. Sodium chlorate; amorphous precipitate.

Various Menstruums.—2 cc. of the bismuth solution added to the liquids, of which 10 cc. were used, except where otherwise stated.

23. Water 2 cc.; no precipitate. See also experiments 1, 2, 3.

24. Water 100 cc.; after 24 hours prismatic crystals, F.

25. Glycerin; no precipitate,—added to 100 cc. water; no change.

26. Glycerin 10 cc. and water 100 cc. mixed; no precipitate.

27. Syrup; no precipitate.

The appearance of commercial bismuth sub-nitrate after elutriation is shown under G and H.

Quantitative Results.—10 cc. of the solution were precipitated, first with 50 cc. cold water; secondly with 50 cc. boiling water, and thirdly with 500 cc. cold water; the precipitates were dried in an air-bath, weighed, then ignited and again weighed. A sample of bismuth subnitrate IV, prepared strictly in accordance with the Pharmacopœia of 1870, was examined in like manner. The results were as follows:

	I.	II.	III.	IV.
Weight of precipitate, .	1·0 gm.	1·05 gm.	·396 gm.	1·0 gm.
Weight of oxide, . .	·753 gm.	·855 gm.	·329 gm.	·865 gm.
Percentage of oxide, .	75·3	81·4	83·3	86·5

The formula $BiONO_3$ indicates 81·2 per cent. Bi_2O_3, and the formula $BiONO_3H_2O$=76·47 per cent. of oxide, obtainable by ignition.

The leaves of Gossypium barbadense, according to Anderson, are used in Jamaica as a galactagogue, in the form of infusion, 6 or 8 leaves being used to the teacupful. The taste of the infusion is not unpleasant, and may be improved by the addition of milk and sugar. According to the effect produced, four teacupfuls or more are taken in 24 hours.—*Arch. d. Phar.*, Oct., 1882, p. 762; *Allg. Med. C. Ztg.*

ANALYTICAL RESEARCHES AND INVESTIGATIONS.

COLLATED BY PROF. FREDERICK B. POWER, PH.D.

A new Method of Testing Butter for Foreign Fats. By T. Taylor.—A piece of pure butter, to which two drops of sulphuric acid are added, gives a whitish yellow, untransparent liquid, in which, after about five minutes, a very pale scarlet-red coloration begins to appear at the edges. Fresh oleomargarin from beef tallow gives immediately a transparent, amber-colored liquid, which, after twenty minutes, appears of a deep carmine-red color; with old and rancid oleomargarin, the liquid becomes dark-brown and untransparent. Plant fats, as, for instance, cocoanut oil, give a pale amber-colored liquid, which, in about thirty minutes, assumes a pale red color, readily changing to violet.—*Chem. Zeitung*, No. 34, 1882, from *Biedermann's C.–Bl.*, ii, 345.

On the Detection of Artificial Butter. By P. Casamajor.—The author brings a specimen of the butter, previously melted and freed from any deposit or scum, into alcohol of a definite specific gravity, and observes whether the fat sinks, floats upon the surface, or remains suspended in the liquid. In the latter case the fat has the same specific gravity as the respective alcohol. Pure butter remains suspended at 15°C. (59°F.) in alcohol of the specific gravity 0·926, corresponding to 53·7 per cent. Fat and beef tallow on the contrary are borne by alcohol of the specific gravity 0·915, corresponding to 59·2 per cent. In the examination of a mixed butter it is therefore necessary to form a liquid, by the addition of a specifically heavier or lighter alcohol, in which the specimen just floats. From the strength of the alcoholic mixture a conclusion may be drawn as to the percentage amount of artificial butter in the mixed butter.—*Ibid.*, from *Ibid.*, p. 344.

The Estimation of Neutral Fat in Mixtures of Fatty Acids. By M. Gröger.—O. Hausamann has directed attention to the fact that when an alcoholic solution of potassium hydrate is added, drop by drop, to an alcoholic solution of a mixture of free fatty acid and neutral fat, only the former becomes saponified, while the latter remains unchanged. The author has confirmed in general the correctness of this statement. He dissolved to this purpose neutral beef tallow in boiling alcohol, added a few drops of an alcoholic phenolphtalein solution and 0·1 cubic centimeter of one-half normal alcoholic potassa solution; the solution became immediately red, and the color was retained, even at the boiling temperature, for about five minutes, from which it may be seen that the saponification indeed proceeds very slowly. The author, therefore, proceeds for the separation of the fatty acid from the neutral fat in the

following manner: From 4 to 8 grams of the fatty acid mixture to be tested, according to the greater or less amount of neutral fat, are dissolved by the aid of heat, in a flask of about 300 cubic centimeters capacity, in 50 cubic centimeters of strong alcohol; after the addition of a few drops of phenolphtalein solution, alcoholic one-half normal alkali solution is added from a burette until the red color no longer immediately disappears upon agitation, and the solution is then diluted with 150 cubic centimeters of water. An alcohol is thus formed of from 20 to 25 per cent., in which the neutral fats are practically insoluble, while the potassium soaps dissolve to a perfectly clear liquid. After cooling, 60 to 100 cubic centimeters of ether are added, the flask closed with a cork, and actively agitated, and then allowed to repose until the soap solution below the etherial layer has become perfectly clear. The larger portion of the clear soap solution is then removed from the flask by means of a pipette, with the precaution not to remove the supernatant etherial layer, subsequently largely diluted with water and heated to boiling until the ether and alcohol have become perfectly dissipated. The fatty acids are afterwards liberated by means of dilute sulphuric and hydrochloric acids, and when they have become perfectly separated as an oily layer they are washed with hot water until the latter no longer shows an acid reaction, and afterwards allowed to cool. If the fatty acids solidify to a compact mass this is removed without consideration of the portions that remain attached to the sides of the vessel; if, however, the fatty acids remain liquid the larger part is removed by means of a pipette. The equivalent weight, or the weight which is exactly saponified by 1 liter of normal alkali, is now determined, after the fatty acids have been previously carefully dried; one-half normal alcoholic potassa solution being applied in the process of filtration.

The number of cubic centimeters of normal alkali required for the neutralization of the free fatty acids in the normal mixture of fats, multiplied by the thousandth part of the equivalent weight thus found, gives the amount of the therein contained fatty acids, and therewith also the amount of the admixed neutral fat.—*Ibid.*, from *Dingl. Polyt. Jour.*, 244, p. 303.

A new Method of Detecting and Removing the Impurities of Chloroform. By Ivon.—Potassium permanganate is reduced by impure, but not by pure chloroform. A solution of 1 gram of potassium permanganate in 10 grams of an alcoholic potassa solution and 250 grams of water, which possesses a beautiful violet color, assumes immediately

upon the addition of impure chloroform a green color. The liquid then becomes colorless and oxide of maganese is separated. The author purifies the chloroform by dissolving potassium permanganate in the smallest possible quantity of water, adding 20 grams of caustic potassa, and mixing this solution in a large bottle with the chloroform, which is agitated from time to time. After some hours it is decanted, and a new solution added until, even after standing for some hours, the red color remains permanent. The chloroform is then poured off, deprived of water by means of potassium carbonate, and distilled.—*Ibid.*, from *Giorn. Farm. Chim.*, 31, p. 193.

A new Reaction of Narceine. By C. Arnold.—Upon warming a trace of narceine with a mixture of equal parts of concentrated sulphuric acid and phenol a yellow, and then a brownish color is obtained, which, when the phenol begins to volatilize assumes a fine cherry red, permanent upon continued heating, and, upon the addition of a few drops of water becomes of a dirty whitish-yellow. Veratrine, when treated in the same way, gives the cherry-red coloration as with sulphuric acid alone, resembling very much that of narceine, but upon the addition of water becoming of a canary-yellow color. Codeine becomes at first of a dirty reddish-violet, and upon warming, of a dirty-brown. Delphinine at first brick-red, and upon warming, red-brown. The reactions of the sulphuric acid-phenol mixture with other alkaloids are not very characteristic.—*Ibid.*, No. 47, 1882, from *Rep. an. Ch.*, 2, p. 229.

Estimation of Morphine in Opium.—The Paris Society of Pharmacy has agreed upon the following method for the valuation of opium: 15 grams of the opium to be tested are intimately mixed with 9 grams of calcium hydrate, 150 cubic centimeters of water gradually added with continued trituration, and the mixture occasionally agitated for half an hour. The mixture is then poured upon a filter, and exactly 100 cubic centimeters of the filtrate brought into a stoppered glass vessel. Twenty cubic centimeters of ether are now added and agitated, and, after dissolving 6 grams of powdered chloride of ammonium in the liquid, it is allowed to repose for two hours. The ether is then decanted, replaced by a fresh portion, and after repeated agitation again decanted. The precipitate of morphine is finally collected upon a smooth filter, washed with a few cubic centimeters of cold, distilled water, dried and weighed. The weight of the dried precipitate, after deducting the weight of the filter, when multiplied by 10, represents the percentage amount of morphine in the opium.—*Phar. Zeitung*, No. 60, 1882, from *Jour. de Pharm. d'Alsace-Lorraine.*

HUFNER'S REACTION WITH BULLOCK'S BILE AND SOME PROPERTIES OF GLYCOCHOLIC ACID.

BY F. EMICH.

While preparing glycocholic acid by mixing bile with ether and hydrochloric acid (Hüfner's method), the author observed that some biles only deposited the acid after several days; he has therefore further investigated the subject, with the following results. Of several samples of Graz galls, 50 per cent. gave the reaction in the first hour, 15 per cent. within a week, while the remainder did not show it at all. From an examination of 14 samples he infers that—1. The quantity of glycocholic acid which separates out is inversely as the time of of crystallization, *i. e.*, the quicker the crystallization the larger the yield, etc. 2. Benzene is better than ether; with benzene and hydrochloric acid the separation takes place more quickly, is more copious, and is even produced in those biles which give no precipitate with ether. 3. Cow bile gives crystals more frequently than ox bile, as Hüfner has already remarked. For a more complete examination of the biles he divides them into two classes; those which crystallize within half an hour he calls "crystallizing biles," and those which do not do so within 24 hours are called "non-crystallizing biles." In outward appearance and density they are alike. The following are the results of the quantitative examination of the two classes of bile:

Constituent.	Crystal-lized bile.	Non-crystal-lized bile.	Remarks.
Water	92·44	91·42	Loss at 105°C.
Sodium glycocholate.	3·12	0·69	Calculated from the lead salt precipitate.
	3·00	....	Calculated from Hüfner's reaction precipitate.
Sodium taurocholate.	2·81	5·40	Calculated from sulphur found.
Mucin	0·24	0·22	Alcoholic extract, less ash of ext.
Inorganic salts	0·64	0·68	From ash after extraction of the bile acid salts.

The only important difference between the two classes of bile is therefore in the proportion of the glycocholic and taurocholic acids. The author therefore assigns as a reason for the non-crystallizing biles not showing Hüfner's reaction that they contain no more or very

little more glycocholic acid than can be dissolved by the taurocholic acid set free on the addition of acid.

Solubility of Glycocholic Acid.

In water—

Temperature of water	20°	60°	80°	100°
Glycocholic acid dissolved (per cent.)	0·033	0·102	0·235	0·85

In alcohol—

Strength of alcohol (per cent.)	1	2	10	20	30	50
Acid dissolved (per cent.)	0·035	0·049	0·10	0·275	1·674	27·53

In taurocholic acid—

Strength of solution employed (per cent.)	1	5	10
Glycocholic acid per cent. dissolved	0·056	0·37	0·69

Ether, benzene, and chloroform at 20°C. dissolve respectively 0·093, 0·009, and 0·011 per cent. of glycocholic acid.

Strecker observes ("Handwörterbuch," 2, 1192) that glycocholic acid melts above 100°, giving off water and forming glycocholonic acid. The author finds the melting point always constant at 132 to 134°, but has not remarked the loss of 3·9 per cent. (1 mol.) of water necessary for the above change. At 100 to 115° the loss in weight is insignificant; at 140 to 150°, after eight hours, it is 2·6 per cent.; at 160 to 170°, after two hours, it is 4·5 per cent. When a saturated solution of pure glycocholic acid is boiled with water for 24 hours, about 22 per cent. is converted into *paraglycocholic acid.* This acid (m. p. 183 to 184°) is nearly insoluble in water; the solution shows no reaction with litmus, and is tasteless, although the acid itself is intensely bitter. The dry substance adheres strongly to glass, and appears to be a very bad conductor of electricity. Titration with soda (the glycocholates are neutral) proves that glycocholic acid is monobasic.—*Jour. Chem. Soc.*, Nov., 1882; from *Manatsh. Chem.*, 3, 325–342.

ESTIMATION OF TANNIN.

By F. Simand.

The author had occasion to make a number of tannin estimations according to Löwenthal's improved method, and found that the percentage of tannin in the same material was subject to certain variations, higher results being obtained when a larger quantity of material was boiled out. A series of experiments was therefore made, the object

being to ascertain the cause of this discrepancy. The analyses were conducted in the following manner: The solution of potassium permanganate contained 1 gram per liter, 1 cc. equal to 0·00135 g. tannin. It is standardized with iron, and the tannin equivalent calculated according to Neubauer's estimations (0·063 g. oxalic acid = 0·04157[1] g. tannin). The indigo solution is prepared so that 20 cc. require 18 to 20 cc. of the solution of potassium permanganate. In titrating the tannin infusion the author invariably used 20 cc. of indigo solution, the advantage being that the liquid to be titrated gives the same yellow color in each case, so that the eye gradually becomes accustomed to it. The gelatin solution is made according to Löwenthal's prescription, the filtration, however, is conducted according to Kathreiner's method. In preparing the infusion the quantity of tannin should be regulated so that 10 cc. of the solution require 12 cc. of potassium permanganate. Although it is unnecessary to adhere strictly to this strength, it is important to consider the quantity of tannin taken, and not to use too small a quantity, in which case the above-mentioned error would be multiplied. Again, it is not advisable to have the infusion in too concentrated a state, as the oxidation-products of the organic substances affect the yellow color very considerably and hinder the recognition of the end reaction. In order to ascertain whether the extraction has been complete ferric oxide paper is used, *i. e.*, strips of filter-paper are steeped in a solution of 1 gram ferric chloride, and 1 gram sodium acetate in 100 cc. water, and dried in the air. This paper gives a distinctly visible black stain with a solution containing 1 part of tannin in 10,000 water. With a smaller quantity, a black ring is produced round the drop of the solution poured on filter-paper. The acidulated water used contains in 100 cc. 3·786 g. H_2SO_4.

The analysis is made as follows: 10 cc. of the infusion are treated in a shallow porcelain basin with 1 liter of water and 20 cc. indigo solution. Potassium permanganate is then added slowly drop by drop until a yellow color with faint reddish tinge is produced. To determine the oxidizable "non-tannin" constituents the tannin in 50 cc. of the infusion is precipitated with 50 cc. of gelatin solution saturated with salt, and 25 cc. acidulated water. After shaking up and allowing to stand for some time the mixture is filtered. 25 cc. of the clear filtrate (corresponding to 10 cc. infusion) are then treated with 1 liter

[1] According to Councler and Schroeder the correct equivalent is 0·03425 to 0·03430 gm.—*Berichte*, 1882, p. 1373.

of water and 20 cc. indigo solution, and titrated with potassium permanganate. By deducting from the quantity of potassium permanganate used in the direct titration the quantity consumed in the second titration the number of cubic centimeters required to oxidize the tannic acid in 10 cc. of infusion is obtained. As the volume corresponding to a certain weight of extracted material is known, and the potassium permanganate value of the tannin has been determined previously, it is easy to calculate the percentage of tannin in the tanning materials, provided that in the gelatin filtrate the "non-tannin" bodies only are titrated. This, however, was found not to be the case. The consumption of potassium permanganate in titrating the gelatin filtrate is mainly due to the solubility of the "gelatin tannate" in dilute sulphuric acid. The author is investigating this point with a view of remedying it.—*Jour. Chem. Soc.*, Nov., 1882; from *Dingl. Polyt. J.*, 244, 303–411.

THE INFLUENCE OF GUM ARABIC IN CERTAIN CHEMICAL REACTIONS.

By J. Lefort and P. Thibault.

It is known that the presence of certain organic substances in saline solutions may prevent the formation of a large number of precipitates. In this respect the influence of tartaric acid is familiar to chemists. The researches it is proposed to describe warrant the statement that some neutral bodies, and gum arabic in particular, also enjoy this property.

Upon this principle is based the therapeutic employment of soluble sulphide of mercury, as described by M. Lambron in a communication to the French Academy of Medicine. M. Lambron pointed out that when an aqueous solution of bichloride of mercury is added to the sulphuretted Luchon water a precipitate of sulphide of mercury is rapidly formed, which falls to the bottom of the vessel as a black powder. But if, instead of introducing the bichloride of mercury directly, it be previously mixed with syrup of gum or sarsaparilla, beef tea, albumen or apple jelly, and then poured into the Luchon water, in proportion a little in excess of the sulphur strength of the water, no precipitate is formed, even after several weeks of contact. This observation induced M. Lambron to suppose that when bichloride of mercury is dissolved and mixed with gummy and albuminous

substances, and then poured into the sulphuretted Luchon water, the chemical action is suspended, *i. e.*, no sulphide of mercury is formed. The authors believe that although the experiments of M. Lambron may be correct his interpretation is not admissible.

At first it might be supposed that the viscosity of the solution was the cause of the non-precipitation. But this is not the case, for if the syrup of gum be replaced by simple syrup or glycerin a precipitate is formed. It would therefore appear that the prevention of the formation of the precipitate is due to the gum or vegetable extract contained in the precipitate, and this was confirmed by the authors' experiments. The reaction is not peculiar to Luchon water and solutions of sulphuretted hydrogen, or monosulphide of sodium may be substituted without sensibly modifying the results.

The authors therefore thought it would be interesting to ascertain whether gum equally prevented the precipitation of the different metallic sulphides, using solutions suitably diluted. For this purpose a titrated solution of monosulphide of sodium was prepared containing 1·7 gram of sulphydric acid per liter; on the other hand, a certain number of solutions each also containing a corresponding quantity of a metallic salt per liter; finally, a clear solution of 1 part of gum arabic in 2 parts of water. The observations were made in the following manner:

Two quantities of 10 cc. of the solution to be examined were run from a graduated pipette into two glasses of equal volume; with one of these 3 cc. of solution of gum was incorporated by stirring and to the other 3 cc. of distilled water was added; finally 10 cc. of sulphuretted solution was added to each and rapidly mixed. The following table represents what was observed both after a few minutes and some weeks:

	Without Gum.	With Gum.
Lead acetate,	Black precipitate,	Clear brown solution.
Silver nitrate,	Black precipitate,	Clear black solution.
Ferrous sulphate,	Black precipitate,	Clear black solution.
Manganous sulphate,	Rosy flesh-colored precipitate.	Clear light brown solution.
Mercuric chloride,	Black precipitate,	Clear dark brown solution.
Copper sulphate,	Black precipitate,	Clear dark brown solution.
Zinc sulphate,	White precipitate,	Clear colorless solution.
Antimonous chloride in solution acidified by HCl.	Orange precipitate,	Clear orange solution.
Arsenous acid,	Citron-yellow precipitate.	Clear citron-yellow solution.

It will be seen, therefore, that under the conditions stated gum prevented the precipitation of metallic sulphides. In concentrated solutions, or when the proportion of gum was very small, more or less incomplete precipitations were observed.

It next appeared interesting to ascertain whether gum has also the power to stop the precipitation of metallic oxides and of alkaloids by the ordinary reagents. The following were the results obtained.

As to the metallic oxides it is unnecessary to enter into details of the experiments, it will be sufficient to say that they behaved like the sulphides in the presence of solution of gum. But since the oxides are, as a rule, much more soluble in water than the corresponding sulphides, metallic solutions of double the strength were used, and a corresponding solution of caustic soda.

The action of gum upon the formation of certain other precipitates was also studied, the following being the results observed:

	With Gum.	Without Gum.
Neutral phosphate of ammonia and calcium chloride.	White gelatinous precipitate.	Clear colorless solution.
Uranium nitrate and potassium ferrocyanide.	Chocolate-brown precipitate.	Clear brown solution.
Very dilute solution of ferric chloride and ammonia.	Brown gelatinous precipitate.	Clear light brown solution.

In a like manner no precipitates were produced in the presence of gum in solutions of 1 in 1,000 of the following alkaloids: quinine, cinchonine, morphia, strychnia, brucia and veratria, by the usual alkaloidal reagents—phosphomolybdate of ammonia, double iodide of mercury and potassium and tannin. If it be remembered that the separation of alkaloids by their reagents has to be effected in the presence of various organic matters that accompany them either naturally or accidentally, these researches acquire for toxicology an unmistakable importance.

It is necessary also to note that certain vegetable infusions—among others that of tea—are opposed to the precipitation of sulphide of mercury. The liquid only acquires a darker color, consequent upon the presence of sulphide of mercury formed; this, however, is the same as happens with gum solutions.

Notwithstanding the numerous instances that have been quoted, the

non-precipitation of dilute solutions in the presence of gum is not absolutely general. The iodides of lead and mercury, sulphate of barium and carbonate of lead are precipitated in solutions containing gum more slowly, but nearly as completely as in distilled water.

The question arises whether in the presence of these facts it is necessary to conclude that the ordinary reactions undergo modification. Contrary to the opinion of M. Lambron, the authors think it is not. Although precipitation does not take place, it is evident from the intense coloration of most of the gummy liquids, as compared with that of the liquids floating above the precipitates, that the compounds are formed, but that they remain, if not in solution, at least in such a state of division that they pass through any filter; and the microscope, even with the strongest powers, does not reveal any trace of solid matter in suspension. Under these conditions it might be asked whether gum does not possess the property of dissolving metallic sulphides and oxides. Such an interpretation would be inexact, because recently formed precipitates are not redissolved when submitted to the action of a very concentrated solution of gum.

Although the phenomenon has not the generality that might be expected, the authors publish these results as affecting not only therapeutics, but also analytical chemistry and toxicology. It is alo suggested that they are worthy of the attention of physiologists, since most of the organic liquids contain gum or analogous substances, and it is therefore possible to conceive the simultaneous existence in the soluble state in animal or vegetable cells of compounds reacting chemically upon each other.—*Phar. Jour. and Trans.*, Oct. 14, 1882, from *Jour. de Phar. et de Chim.* [5], vi, 169.

CONTRIBUTIONS TO THE STUDY OF ANTISEPTICS.

By F. Boillat.

Koch having declared in a recent paper that most of the substances at present employed at disinfectants are practically useless, and that the only ones worthy of the name are chlorine, bromine, iodine, and corrosive sublimate, with possibly potassium permanganate and osmic acid, the author undertook the investigations recorded in this paper; he thinks that this contradiction of generally accepted facts is not as strong as it appears. As the antiseptics employed in surgery do not require to be perfect, it is sufficient for the purpose of the surgeon if

the propagation of the organisms is arrested for a time long enough to allow the wound to heal. The spores by which some of the bacteria are propagated bear much analogy to the eggs of certain animals and the seeds of certain plants which preserve their vitality under very severe conditions, some of them not being killed even by weak acids. The classification of bacteria, according to their resistance to the action of antiseptics, has been commenced and carried to an advanced stage by Koch; the spores of the splenic fever organism preserve their vitality for many days in a 1 per cent. aqueous solution of phenol, or a 5 per cent. solution of zinc chloride, but their development is arrested; this suffices for medical purposes, as although chlorine, etc., would effectually destroy them, they would also severely injure the patient to whose wounds they might be applied.

Most antiseptics form permanent insoluble compounds with albumin, for example, egg albumin treated with a dilute solution of zinc sulphate or chloride forms Lieberkühn's zinc albuminate having the composition $C_{72}H_{112}N_{18}SO_{22} + ZnO_2H_2$: similar reactions occur with the other substances named by Koch, and would also occur when applied to wounds.

Samples of blood serum and egg albumin, diluted with three or four times their weight of water, were precipitated with solutions of phenol, zinc chloride, copper sulphate, corrosive sublimate, etc.—the precipitate thrown on a filter, washed until the wash-water was free from traces of the reagent, 2 or 3 grams of the damp substance was then beaten with water to a thin paste, and allowed to remain at the ordinary temperature, loosely covered with a bell-glass; watch-glasses containing serum and Koch's nutritive gelatin, without any additions, served to control the experiments, which were divided into three series —in the first the substances were left to the action of floating germs in the air. The control samples were infected in 24 hours, and became putrid in 2 to 4 days, but the other samples remained sound from 6 up to 60 days in the case of the mercury albuminate. In the second series the samples were sown with cocci, found on an infusion of coffee, and the third with splenic fever germs; in both of them the unprotected samples showed a remarkable increase of germs within the space of 2 days.

The albumin precipitated by phenol became putrid in 48 hours; the sample on being distilled with water showed no trace of phenol on adding bromine, the washing having removed it. This experiment

was therefore a failure. Copper, zinc and mercury albuminate remained for 4 weeks without perceptible change, and the author believes they would remain so for an unlimited period were oxygen and water absent.

Other experiments made with such materials as iodoform, carbon dichloride, tetrachloride, and hexachloride, solid and liquid bromotoluene, which have been favorably noticed in medical journals, were unsuccessful, and the author believes them useless as antiseptics.—*Jour. Chem. Soc.*, Nov., 1882; from *J. pr. Chem.* [2], 25, 300–309.

THE EXAMINATION OF BALSAM OF PERU.

BY O. SCHLICKUM.

The author reports the results of a number of experiments having for their object the facilitating of the examination of balsam of Peru for adulterants and the quantitative determination of these when present. As materials he used five guarantee samples of balsam obtained at different times from different sources. The possible adulterants particularly investigated were castor oil, copaiba balsam, purified storax, an alcoholic solution of benzoin brought to the consistence of a balsam, and a similar solution of colophony. Before proceeding to methods of investigation the author makes the following remarks on the specific gravity and the free acids of Peru balsam.

The specific gravity is a very important criterion of unsophisticated balsam. All the other substances above mentioned possess a lower specific gravity than the true Peru balsam. The highest of the five specimens examined by the author was 1·148 and the lowest 1·142. Any sample of Peru balsam having a specific gravity lower than 1·135 may therefore be regarded as adulterated. The specific gravity of castor oil and of copaiba balsam is in each case under 1·00, that of the former varying between 0·95 and 0·97, and that of the latter between 0·94 and 0·99. The specific gravity of the purified storax, which was obtained as a brown transparent balsam by extracting liquid storax with alcoholic ether and evaporating the clear filtrate, was determined as 1·090; that of the colophony solution as 1·016; and that of the benzoin solution as 1·080. These are all considerably below the specific gravity of the true Peru balsam, so that an addition of one of them would markedly lower its specific gravity. For instance, an

addition of 15 per cent. of benzoin solution to Peru balsam, specific gravity 1·146, lowered the specific gravity to 1·135. The author prefers to use the pycnometer in determining the specific gravity of the balsam. The plan recommended by Hager, of observing whether a drop of balsam floats or sinks in a saline solution of known density, he considers to be defective, as the behavior of the drop is affected by the conditions under which it reaches the surface of the solution.

The author does not consider that the estimation of the free acid constitutes such a good criterion as the specific gravity. The five genuine samples of Peru balsam required from 5·1 to 7·2 per cent. of soda crystals for their exact neutralization. The purified storax corresponded to 4·5 to 5·1 per cent.; the copaiba balsam to 5·1 per cent.; the colophony solution to 7·5 per cent.; the benzoin solution to 14 per cent. of soda; only the castor oil was devoid of free acid. The estimation of free acid would therefore only be of use in conjunction with other tests, chiefly in the determination of admixture with benzoin or castor oil, the former increasing and the latter diminishing the acidity.

A. Behavior of Balsam of Peru towards Solvents.—(1). Spirit of wine dissolves half its weight of Peru balsam almost clear; a further addition of spirit, however, renders the solution turbid, through separation of a small quantity of resin. Ether behaves similarly; it mixes clear with an equal quantity of balsam, but the solution becomes turbid upon the addition of more ether, resin separating equal to about 6 per cent. of the Peru balsam.

As ether and alcohol easily form clear solutions with both castor oil and the colophony solution, they do not furnish a means for detecting admixtures of these substances. Purified storax and copaiba balsam give with alcohol very turbid and with ether clear solutions; benzoin solution mixes clear with alcohol, and turbid with ether, about 10 per cent of resin separating. Consequently these solvents give no decisive indication of adulteration of Peru balsam with the last three substances.

(2). Carbon bisulphide dissolves Peru balsam with the exception of 11 to 16 per cent. of resin, which adheres so fast to the sides of the vessel that the light colored solution can be poured off clear. Benzoin resin is almost insoluble in carbon bisulphide, giving up only the benzoic acid present, so that carbon bisulphide furnishes a good means for detecting a large admixture of benzoin. The following table shows the behavior of one part of the substance tested in two parts of carbon bisulphide.

One part of	In two parts of Carbon Bisulphide.
Peru balsam, .	At most 16 per cent. of resinous residue. The genuine samples varied from 11 to 16 per cent.
Purified storax, .	Dissolved completely; clear solution.
Colophony solution,	Entirely soluble; perfectly clear.
Copaiba balsam, .	Dissolved completely; quite clear.
Castor oil, .	Dissolved completely; quite clear.
Benzoin solution, .	60 per cent. of resinous residue.

Consequently if a sample of Peru balsam, when shaken with double its weight of carbon bisulphide, yields more than 16 per cent. of undissolved resinons residue, an admixture of solution of benzoin is probable.

(3). Petroleum spirit takes up from Peru balsam a light yellowish balsam, probably consisting principally of cinnamein (benzyl cinnamate). Upon saponifying this with alcoholic solution of caustic soda, besides sodium cinnamate, benzyl alcohol is obtained, easily recognized by its intense hyacinth odor. By repeatedly shaking Peru balsam with three or four times its quantity of petroleum spirit half of it is dissolved and half remains undissolved. The following shows the relative behavior of the other subtances:

	Shaken with Petroleum Spirit.
Peru balsam, . .	Half dissolved.
Purified storax, .	About one-third dissolved.
Benzoin solution, .	Only 12 per cent. dissolved.
Colophony solution, .	More than half dissolved (40 per cent of resin).
Copaiba balsam, .	All dissolved.
Castor oil, . .	All dissolved.

Consequently if a sample of balsam gives up more than 50 per cent. to petroleum spirit an admixture of copaiba balsam or castor oil is indicated.

B. Behavior of Peru Balsam towards Caustic Lime.—When Peru balsam is mixed with dried calcic hydrate no saponification or decomposition of the cinnamein contained in it results; neither does it take place if water or alcohol be added. The cinnamein can be extracted from the mixture by means of petroleum spirit, and in a large number of experiments with Peru balsam the proportion was found to remain constant at 41 per cent. of the balsam used. From the residue undissolved by petroleum spirit ether dissolves out about 14 per cent. of styracin, which differs from cinnamein in being difficultly soluble in cold alcohol, and in yielding upon saponification with alcoholic soda solution not benzyl alcohol, but cinnamyl alcohol, together with sodium cinnamate.

Purified storax behaves similarly, but gives up somewhat less cinnamein to petroleum spirit and about as much more styracin to ether. Colophony and benzoin solutions, when macerated with calcic hydrate, combine with it so that petroleum spirit extracts scarcely anything from the mass. On the other hand, castor oil can be completely removed with petroleum spirit as long as there has been no addition of water; but if castor oil be digested in a water bath for several hours with calcic hydrate and successive additions of water, saponification takes place, and petroleum spirit no longer dissolves out oil from the mass. Copaiba balsam behaves similarly, its resin eventually combining with the lime, after which petroleum spirit only dissolves out the essential oil of the balsam.

After several hours' digestion with caustic lime and water petroleum spirit removes from—

Peru balsam, . . .	41 per cent.
Purified storax, . . .	35 per cent.
Copaiba balsam, . . .	Its essential oil.
Castor oil, ...	Almost nothing.
Benzoin solution, . . .	Almost nothing.
Colophony solution, . .	Almost nothing.

This method is not very suitable for the recognition of the substances used for sophistication, but it is of great value in their quantitative determination.

C. Behavior of Peru Balsam towards Caustic Ammonia.—When an ethereal solution of Peru balsam is shaken with ammonia solution, sp. gr. 0·960, two yellowish-brown layers are formed, between which brownish flocks swim. The upper layer is the ethereal solution of the balsam, and leaves, when separated and evaporated, about 80 per cent. of the quantity used as a brown balsam. The inconsiderable resinous mass swimming between the two layers adheres partially to the side of the vessel. The lower ammoniacal layer, when separated and rendered acid with acetic acid, shows a whitish turbidity, but becomes almost clear on boiling and again turbid on cooling through separation of cinnamic acid, without, however, forming a solid deposit at the bottom. The ammonia solution withdraws the free cinnamic acid from the balsam, without affecting its other constituents.

Benzoin solution behaves similarly. It gives up to the ethereal layer the greater part of its resin, whilst the watery layer takes up the benzoic acid, and upon supersaturation with acetic acid and boiling becomes only slightly turbid.

Castor oil passes so completely into the upper ethereal layer that the ammoniacal layer, upon being acidified, scarcely separates a single oil globule.

In the case of colophony solution and copaiba balsam the resin combines with the ammonia, so that when the lower layer is rendered acid and boiled, a considerable separation of solid resin takes place.

With purified storax there is scarcely any separation into two layers, but it yields a stiff homogeneous jelly that will hardly flow from the glass.

This holds nearly good for a mixture of equal quantities of Peru balsam and purified storax; if less storax be present there is a separation into layers, but gelatinous lumps are to be seen smimming in the ethereal solution. Whilst also with Peru balsam the lower ammoniacal layer, when separated and supersaturated with acetic acid, appears only slightly turbid upon boiling, the lower liquid layer from a balsam adulterated with copaiba balsam or colophony, when similarly treated, shows a separation of more or less solid resin.

D. Action of Strong Sulphuric Acid on Balsam of Peru.—If Peru balsam be mixed with at least an equal quantity of concentrated sulphuric acid, the mass becomes hot, blackened and thickened. Upon washing it with hot, and afterwards with cold water, it is at first plastic, but after cooling becomes solid and brittle. If it be spread out smooth, dried superficially with blotting paper, crushed and placed in a test tube with several times its quantity of ether, complete solution takes place in a short time. When a small quantity (1 to 2 grams) of Peru balsam is used no smell or frothing or evolution of vapor is observed when the mixing takes place; but with larger quantities these phenomena are manifested, sulphurous acid being set free. When the test is used with the adulterants mentioned, their behavior in small quantities—1 gram—exactly resembles that of genuine Peru balsam; except in the case of copaiba balsam, with which, even in the smallest quantity, there is strong frothing and an evolution of white vapor and sulphurous acid. With colophony, benzoin, storax and castor oil, these appearances are first manifested with a quantity exceeding two grams. Consequently, if frothing and evolution of sulphurous acid commences when the quantity is limited to 1 gram, the presence of copaiba balsam may be concluded.

The washed resinous mass is completely soluble in ether, as before mentioned, so long as it contains neither benzoin nor storax. But if

only a small quantity has been taken for the experiments, so that no reduction of sulphuric acid has taken place (1 gram of balsam and 1 gram concentrated sulphuric acid), a sample containing storax or benzoin yields a mass that when washed and superficially dried is only partially soluble in ether. Upon mixing 1 gram of substance with 1 gram of concentrated sulphuric acid, and subsequently washing with hot and afterwards with cold water, there was obtained with Peru balsam, copaiba balsam, or colophony, a solid brittle mass completely soluble in ether; with purified storax or benzoin a solid brittle mass, only partially soluble in ether; and with castor oil a smeary greasy mass completely soluble in ether.

The smeary property which castor oil imparts to the sulphuric resinous mass indicates with certainty the presence of this oil. In the case of all the other substances the washed residue possessed a plastic or even crumbling character, and became quite hard on cooling.

If the insoluble residue be well washed on a filter with ether and then treated with alcohol any portion of it derived from benzoin dissolves completely. If it owes its origin to storax a small white residue is left, consisting of a substance first observed by the author in 1881 and which E. Mylius has named styrogenin, and represented by the formula $C_{26}H_{40}O_3$. Styrogenin is still better isolated by treating the residue left by ether with acetone, which dissolves any portion of the residue derived from benzoin completely and that from storax all except the styrogenin. Styrogenin is insoluble in water, alcohol, acetone and alkalies, but is easily soluble in chloroform. It can therefore be readily got pure by treating with a little chloroform the white powder left after washing the ether residue with acetone or spirit, and allowing the chloroformic solution to evaporate in a watch glass. The styrogenin is thus obtained in microscopic crystals partly tabular and partly more pointed, but always prismatic.

If larger quantities of storax be used no styrogenin is obtained, since the reduction of the sulphuric acid thus set up involves the decomposition of the storax in other ways. But with quantities not exceeding 1 to 2 grams storax always yielded the author styrogenin. It is also requisite that the quantity of sulphuric acid used should not be less than that of the balsam. Storax yields from 6 to 7 per cent. of styrogenin.

If therefore a sample of Peru balsam treated with sulphuric acid is not entirely soluble in ether, the residue if completely soluble in

acetone or alcohol indicates an adulteration with benzoin; but if a white powder insoluble in acetone or alcohol be left, it shows an adulteration with storax. This powder may then be dissolved in chloroform and left to crystallize.

SCHEME FOR THE QUALITATIVE EXAMINATION OF BALSAM OF PERU.

(1). The specific gravity should be determined. It should never fall below 1·135.

(2). Upon shaking 1 gram of balsam three or four times with several grams of petroleum spirit, not more than ·05 gram should be taken up, so as to be left behind upon evaporation. Otherwise an admixture of castor oil or copaiba balsam would be probable. The latter would be recognizable by the odor of the essential oil.

(3). Dissolve 1 gram of balsam in several grams of carbon bisulphide and estimate the undissolved portion, dried at 140°C. This should not amount to more than 0·16 gram, otherwise an admixture of benzoin is probable.

(4) *a.* Mix 1 gram of balsam with 1 to 1·2 gram of concentrated sulphuric acid. If frothing and a smell of burning sulphur be observed, an admixture of copaiba balsam is probable. (Confirm by tests 2 and 5.)

b. After the mixture has cooled wash it first with hot and then with cold water. The residue should be at first plastic and afterwards hard and brittle. A smeary character indicates an admixture with castor oil. (Confirm by test 2.)

c. Dry the washed resinous mass superficially with blotting paper, and dissolve it in several grams of ether. It should dissolve completely; if an insoluble residue be left it indicates an admixture of benzoin or storax. Treat this insoluble residue with strong alcohol, or preferably with acetone. If it dissolves completely, the adulterant is benzoin, in cases where carbon bisulphide leaves more than 16 per cent. of the balsam undissolved (test 3). If after treatment with alcohol (or acetone) there remains a white powder, easily soluble in chloroform, and separating in microscopic crystals upon evaporation of the solvent, storax is present. (Confirm by test 5.)

(5). Dissolve 1 gram of balsam in 3 grams of ammonia solution, specific gravity ·960. No gelatinization of the mixture should take place or appearance of gelatinous fragments swimming in the ethereal layer; otherwise storax is present. (Confirm by test 4.) The mixture should

separate readily into two layers, the lower of which when separated, supersaturated with acetic acid and heated to boiling, should only present a slight turbidity. The separation of solid resin shows copaiba balsam or colophony. The former gives the reaction mentioned under test 4; further, the extract obtained by evaporation of the petroleum spirit solution (test 2) has clearly the smell of oil of copaiba, whilst a colophony residue has no special odor.

Quantitative Estimation of Adulterants.

(1). *Estimation of Benzoin Admixture.—a.* An admixture of solution of benzoin increases the amount insoluble in carbon bisulphide, which in the case of genuine Peru balsam was never found by the author to exceed 16 per cent., to the extent of the whole of the benzoin resin, exclusive of the benzoic acid by which it is accompanied, and this may be used as the basis of one method of estimating the extent of adulteration with benzoin.

Example.—1 gram of a mixture of equal parts of Peru balsam and an alcoholic solution of benzoin containing 75 per cent. of resin, when treated with carbon bisulphide, left a residue which, dried at 100° C., weighed 0·38 gram. Of this 0·08 gram is reckoned as belonging to the half gram of Peru balsam, and the remaining 0·30 gram as the amount of resin in the half gram of benzoin solution.

b. A second method of estimating added benzoin is based upon the amount of residue insoluble in ether after the sample of balsam has been treated with sulphuric acid. The undissolved residue amounts to about half the benzoin resin or one-third of the benzoin solution.

Example.—1 gram of a Peru balsam containing 14 per cent. of benzoin solution, after treatment with sulphuric acid, left a residue of 0·05 gram insoluble in ether, which represented 10 per cent. of benzoin.

c. The direct estimation of the Peru balsam in a sample adulterated with benzoin may be effected by repeatedly shaking it with petroleum spirit, which dissolves out nearly half the Peru balsam as well as the benzoic acid of the benzoin. If 1 gram of the balsam be mixed with 0·30 gram of calcic hydrate, and allowed to stand an hour, the petroleum spirit then dissolves only 41 per cent. of the balsam of Peru present, so that the quantity of this may easily be calculated.

Example.—From a balsam mixed with 14 per cent. of benzoin solution, after maceration with calcic hydrate, petroleum spirit dis-

solved 35 per cent. (cinnamein), which, according to the proportion 41 : 100 = 35 : x, indicated 85 per cent. of Peru balsam.

(2). *Estimation of Admixture of Purified Storax.*—As purified storax consists, like Peru balsam, mainly of styracin, cinnamein and cinnamic acid, though with a greater preponderance of styracin, the estimation of added storax is difficult, and can only be effeted by preparation of the crystalline styrogenin as before described. The quantity of styrogenin left after evaporation of the chloroform amounts to about 7 per cent. of the storax present in the balsam.

Example.—1 gram of a mixture of equal parts of Peru balsam and purified storax yielded 0·03 gram of styrogenin.

(3). *Estimation of admixture of Colophony.—a.* The direct estimation of colophony is effected by shaking the ethereal solution of balsam with ammonia solution, sp. gr. ·960, as before described, and separating the resin taken up by supersaturating with an acid. The solid resin dried at 100°C. amounts to seven-eights of the colophony present.

Example.—1 gram of balsam mixed with 23 per cent. of a 60 per cent. solution of colophony yielded 0·115 gram of solid resin from the ammoniacal layer of liquid.

b. The direct estimation of the Peru balsam present may be made by macerating the sample with caustic lime and exhausting with petroleum, as in the estimation of benzoin.

Example.—1 gram of balsam containing 23 per cent. of solution of colophony, macerated with caustic lime, gave up to petroleum spirit 0·32 gram (cinnamein), corresponding, according to the proportion, 41 : 100, to 0·78 gram of Peru balsam.

(4). *Estimation of Admixture of Castor Oil.*—The author was unable to accomplish the direct estimation of the castor oil, being unable to separate it from the balsam by any suitable solvent; nor was he more successful in saponifying it with an alcoholic solution of an alkai. An attempt was also made to remove the oil from the resinous mass resulting from treatment with sulphuric acid, but it was found that the castor oil was so much decomposed by the strong acid as to be no longer soluble in petroleum spirit.

a. The amount of admixture may, however, be estimated by first ascertaining the amount of cinnamein and castor oil dissolved out by petroleum spirit, and then the amount of cinnamein alone. 1 gram of the mixture of balsam and castor oil is first macerated for an hour

with 0·30 gram of caustic lime, without the addition of water, and then exhausted with petroleum spirit, which dissolves the cinnamein (41 per cent.) of the balsam together with all the castor oil. A second quantity, with the addition of water, is macerated in a water bath for several hours, by which the saponification of the oil, but not of the balsam is induced. Petroleum spirit then dissolves only the cinnamein of the balsam. The difference in the two results gives the amount of castor oil, whilst the quantity of Peru balsam can be easily calculated from the cinnamein. Of course the exactitude of the result is dependent upon the complete saponification of the oil.

b. A more simple plan is to exhaust the sample by three or four shakings with petroleum spirit, and then to estimate the soluble constituents by evaporating the solution, and the insoluble by drying the residue. The former include nearly one-half of the Peru balsam, together with castor oil; the latter more than one-half of the Peru balsam present. By subtracting the amount undissolved from that dissolved, an approximation to the quantity of castor oil is obtained.

Example.—1 gram of balsam containing 23 per cent. of added castor oil, left after four shakings with petroleum spirit 0·40 gram undissolved, which indicated approximately 80 per cent. of Peru balsam. The petroleum spirit left upon evaporation 0·60 gram of oily residue, which quantity indicated somewhat more than 20 per cent. of castor oil (0·60—0·40=0·20).

(5). *Estimation of Admixture of Copaiba Balsam.*—*a.* The proportion of Peru balsam is estimated directly by digesting the sample for several hours with caustic lime and water, exhausting the mass completely with petroleum spirit and leaving the filtered liquid to evaporate. In this way there is at first obtained 41 per cent. of the Peru balsam, together with the essential oil of copaiba. To volatilize the latter the residue is heated in a water bath until it no longer perceptibly loses weight. What is now left represents 41 per cent. of Peru balsam, whilst the loss in weight gives the amount of essential oil of copaiba.

b. The amount of copaiba resin is found by means of the caustic ammonia test, as described for colophony. If to this be added the amount of essential oil as obtained in the preceding experiment, the total will represent the amount of copaiba balsam present.

Example.—1 gram of Peru balsam containing 30 per cent. of added copaiba balsam after being digested with lime and water gave up to

petroleum spirit 0·38 gram, which in the water bath decreased to 0·27 gram, representing 0·11 gram of essential oil. The 0·27 gram of residue indicated 66 per cent. of Peru balsam. (41:100.) 1 gram of the same sample gave when treated with ammonia solution 0·17 gram of solid resin, which added to the 0·11 gram of essential oil made a total of 0·28 gram, or 28 per cent. of copaiba balsam.

b. A more simple and sufficiently exact method is to shake the sample repeatedly with petroleum spirit, and to weigh the undissolved portion after drying at 100°C., and the dissolved portion after evaporation of the spirit at the ordinary temperature. The undissolved portion amounts to a good half of the Peru balsam, and by subtracting the amount from that of the evaporation residue, an approximation to the quantity of copaiba balsam is obtained.

Example.—1 gram of Peru balsam containing 30 per cent. of added copaiba balsam, left after shaking with petroleum spirit 0·35 gram undissolved, or equal to 70 per cent. of Peru balsam. The petroleum spirit left upon evaporation 0·65 gram. Consequently 0·65—0·35=0.30 gram (30 per cent.) of copaiba balsam.—*Phar. Jour. and Trans.*, Oct. 21, 1882, from *Archiv der Pharmacie.*

ACTION OF OZONE ON METALLIC SALTS AND OXIDES.

By Mailfert.

Mercurous Salts.—The *nitrate* is entirely decomposed by ozone, with formation of mercuric nitrate and a yellow precipitate of trimercuric nitrate. The *sulphate* behaves in a similar manner, mercuric sulphate and basic sulphate being formed. Mercurous *chloride* is acted on somewhat more slowly with formation of mercuric chloride, and a brick-red precipitate, apparently an oxychloride. The *bromide* is acted on in a similar manner. With the *iodide* the action is extremely slow, mere traces of red precipitate being produced even after the ozonized gas had been passed for 15 hours.

Silver Salts.—With the *nitrate*, a bluish-black flocculent precipitate of peroxide is produced, which, however, is decomposed and redissolved on agitating the solution. The *sulphate* likewise gives peroxide, but the *chloride* and *cyanide* are only very slowly acted on.

Palladium Salts.—The nitrate, chloride, and protoxide give the dioxide by the action of ozone. The protoxide, in presence of potassium hydroxide, gives potassium palladate.

Cobalt and Nickel Salts.—The sulphates, nitrates, and chlorides are but slowly attacked. The protoxides, on the other hand, are easily converted into peroxides.

Lead Salts.—All the basic salts give lead peroxide, as do many of the neutral salts; the chloride, nitrate, oxalate, and phosphate, however, are but very slowly acted on. Lead oxide is also changed into peroxide by ozone, in presence of potassium hydroxide, it gives potassium plumbate.

Manganese Salts.—All the manganese salts, in moderately concentrated solution, give a brown or black precipitate, consisting of the hydrated dioxide if the ozone is in excess, and of a lower oxide if it is not. In the former case a violet solution, containing permanganic acid is frequently produced. If excess of ozone acts on a very dilute solution of a manganous salt (in 30,000 to 60,000 of water), a brown dicroic solution is obtained, which slowly decomposes after a time, depositing a rusty brown precipitate, and leaving permanganic acid in solution.

Chromic Salts.—The sulphate, chloride, and oxide all yield chromic acid. If ether is present, perchromic acid is formed.

Bismuh oxide gives bismuthic acid, and in presence of potassium hydroxide potassium bimuthate.

Iron sesquinoxide is not acted on by ozone, but in presence of potassium hydroxide it yields potassium ferrate.—*Jour. Chem. Soc.*, Nov., 1882; from *Compt. Rend.*, 94, 850–863.

THE HISTORY OF CITRINE OINTMENT.

By R. A. Cripps.

Bell Scholar in the School of Pharmacy of the Pharmaceutical Society.

Paper read before the School of Pharmacy Students' Association, June 22, 1882.

A short time ago I was asked by Professor Attfield to reply to some queries which had been put to him by Mr. Adolph G. Vogeler, of Chicago, respecting citrine ointment. I gladly undertook the work, and the outcome is the present paper. Mr. Vogeler concurs in my wish to read it before this Association.

The preparation known as citrine ointment has from time to time been prepared from numerous and widely-differing formulæ.

The first notice of it is found in the London Pharmacopœia of 1650,

a most complicated formulæ being given to it; among the ingredients may be mentioned white coral, limpet shells, tragacanth, quartz, white marble and white lead, made upon a basis of hog's lard, suet and hen's grease. How such substances could be made into a presentable ointment is difficult to imagine when we remember how little apparatus was at the command of the pharmacists of that day. It is said to have been used in many skin diseases and for freckles.

In the London Pharmacopœia of 1668 the formula remains the same while in those of 1678 and 1682 several of the ingredients are omitted, sugar of lead replaces carbonate, and rosewater, frankincense, and citron bark are added. The Edinburgh Pharmacopœia of 1722 orders under the same name an ointment of an entirely different nature, the formula being:

℞	Hydrargyri, ...	unciam unam.
	Spiritus nitri, . . .	q.s.

Ut fiat solutionem, cui adde paulatim
Axungiæ porcinæ liquifactæ, libram unam.
Misce. Fiat unguentum.

It was not till long after this that a citrine ointment containing mercury was admitted to the London Pharmacopœia, perhaps from the fact that with a formula such as the above very varying results were naturally obtained; indeed, we find no mention whatever of it in the London Pharmacopœia of 1724, while in that of 1746 it is similar to resin ointment with the addition of 1 oz. of yellow wax to each 8 ozs.

Quincy, in the "London Dispensatory" of 1730, gives a similar formula, viz.:

Yellow resin, ...	½ lb.
Sheep's suet, ...	4 ozs.
Turpentine, ...	2 ozs.

To be melted together and strained. No doubt the pharmacist thought this a vast improvement on the former ointment so difficult to prepare; but he was not long to remain in this state of case as regards citrine ointment, for in the London Pharmacopœia of 1787 a new formula was given to it which bade fair to cause him more trouble than the last.

Some say it was introduced in imitation of the well-known "golden eye salve," but others state that it was of French origin, having been used in Paris for the cure of the itch. If the former were the case, it was not satisfactory, "golden eye salve" being an ointment of yellow oxide of mercury.

The formula was:

℞	Hydrargyri pur., ...	unciam unam.
	Acidi nitrosi, ...	uncias duas.
	Axungiæ præp., ...	libram unam.

Dissolve the mercury in the acid, and then mix the boiling liquid with the lard previously melted, remove from the dish and allow to cool. The same formula was used in the Edinburgh Pharmacopœia of 1792, but it was ordered to be stirred diligently during the cooling; a milder ointment was also official, containing half the quantity of lard. In 1803 the Edingurgh Pharmacopæia ordered 12 ozs. of lard instead of 16, the milder ointment containing three times that amount. Notwithstanding these continued alterations the ointment was still very unsatisfactory, it varied greatly with the temperature employed in preparing it, and after keeping usually became gray with greenish patches, and so hard that it could sometimes be powdered. This was stated to be due to the oxidation of the lard by the nitric acid, and many other substances were tried as a basis, among which the most important were butter, olive oil, and neat's foot oil. Accordingly we find in the Edinburgh Pharmacopœias of 1807, 1809, 1813 and 1817 a formula having as a basis 1 part lard to 3 parts of olive oil; in that of Dublin, 1807, 1 of lard to 4 of oil; and London, 1809, 2 parts oil to 3 of lard: still the results were quite insatisfactory, and many were the theories propounded to account for the changes to which it was liable, excess of nitric acid, deficiency of nitric acid, too high or too low a temperature, the presence of salt in the lard, impure mercury, and a fatty basis of unsuitable nature, all received their supporters. Acting upon the first of these theories the authorities of the London Pharmacopœias of 1817, 1824, 1836, and 1851 ordered 11 drachms of acid in place of 2 ounces, the formula of the last being:

℞	Hydrarg. pur., ...	℥i,
	Acid. nitric, ...	ʒxi,
	Ol. olivæ, ...	℥iv,
	Adipis præp., ...	℥viii.

Ft. unguent.

They also ordered a milder ointment, containing one part of strong ointment to 7 of lard. The Dublin Pharmacopœia of 1850 also orders less acid, while those of Edinburgh, 1839 and 1841, direct a larger quantity.

The British Pharmacopœia of 1864 gives the following formula: Take of

Mercury,	4	ounces.
Nitric acid, sp. gr. 1·5,	8	"
Lard,	15	"
Olive oil,	32	"

Dissolve the mercury in the acid with the aid of a gentle heat, melt the lard in the oil, by a steam or water-bath in a porcelain vessel capable of holding six times the quantity, and while the mixture is hot add the solution of mercury, also hot, mixing them thoroughly; if the mixture does not froth up heat till this occurs.

The B. P. of 1867 orders 12 ounces of nitric acid, sp. gr. 1·42.

This formula will give an excellent ointment, and when complaints are made of the result will be found that the fault is in the operator, not in the formula. The instructions must be strictly adhered to, or a failure will probably result, and especial regard must be paid to the temperature af which the mixture is made, which should range from 180° to 200°F., and should not be too long continued, but only until the ointment froths up well; if large quantities be made the temperature may be a little lower. As thus prepared it is of a fine lemon-yellow color, and keeps for a fair length of time, perfectly good.

Such are the varied formulæ which have from time to time been given to this interesting ointment; but before leaving the subject I should like to devote a short notice to the chemistry of the preparation.

The views of chemists regarding the chemical composition of the ointment vary considerably. Evidently the original idea was to obtain an ointment of mercuric nitrate; hence the name given to it in the Pharmacopœias. But this was entirely a failure, for on adding the acid solution of nitrate to the melted lard chemical decomposition occurs, as indicated by the frothing. Still, this was considered as simply the result of the oxidation of the fat by the excess of acid; but Mr. Schacht, who made a number of experiments in the laboratories of the School of Pharmacy, showed that the ointment, when carefully prepared, is soluble in ether, thus indicating that the mercury exists as some compound with a fatty acid, the nitric acid in combination with the mercury being in some way retained while the excess is evolved during effervescence. In M. Schacht's valuable paper (which will be found in the "Pharmaceutical Journal" [1], vol. iv, p. 450, he also

states that the failure in obtaining a good ointment is not due to the presence of salt in the lard, or of lead in the mercury, and that ointment spoiled by keeping may be restored by warming with nitric acid, thus indicating that nitric acid is essential to its preservation, and that by keeping some of the acid is lost.

But in the "Pharmaceutical Journal" [3], vol. vi, p. 708, in a paper by Mr. Fredigke, of Chicago, it is stated that a superior ointment both in appearance and in durability may be prepared by oxidizing the fat by nitric acid, previous to adding the mercurial solution. This would seem to show that the oxidized fat forms a compound with the mercuric nitrate, the color being due to the elaidin formed by reaction of fat and acid.

Such, then, are the results of their experiments; but as they are to a great extent conflicting, it is impossible to arrive at any definite conclusions without experimental research, and pressure of time debarred me from such a course, so that I have been obliged to leave the subject with this historical sketch.—*Phar. Jour. and Trans.*, Nov. 4, 1882.

NITRATION OF CELLULOSE.

By Vieille.

The cellulose used was in the form of cotton-wool. The lowest nitration product, mononitro-cellulose, is obtained by the action of nitric acid of sp. gr. 1·450. It is insoluble in ethyl acetate and in a mixture of alcohol and ether: analyzed by Schloesing's method, 1 gram yields 108·9 cc. of nitric oxide. A nitration product, soluble in a mixture of alcohol and ether, and therefore suitable for making collodion, is given only by acid of sp. gr. between 1·490 and 1·496. It retains the structure of the original cotton, and is entirely soluble in ethyl acetate; 1 gram yields 183 to 194·4 cc. of nitric oxide. The time required to produce the maximum nitration with acid of a particular strength is longer the weaker the acid, 2 to 3 hours sufficing with acid of sp. gr. 1·50, whilst acid of 1·483 requires 120 hours. With acid of sp. gr. 1·470, however, the cotton swells up and dissolves immediately, and under these conditions nitration is rapid; when the syrupy solution is poured into water, a white precipitate, which has none of the structure of the original cotton, is thrown down. Acid of sp. gr. 1·460 acts only slowly on cotton, but the fibres become very brittle, and the

product is collected in the form of a pulp. Weaker acid has little or no action on cotton. The maximum nitration is obtained with a mixture of nitric and sulphuric acids. The result is not sensibly affected by the relative proportions of the two acids, even if Nordhausen sulphuric acid is used, but a large excess of sulphuric acid considerably diminishes the rapidity of the reaction. The product has the composition $C_{24}H_{29}(NO_2)_{11}O_{20}$, retains the appearance of the original cotton, is completely soluble in ethyl acetate, but only very slightly soluble in a mixture of olcohol and ether. I gram yields 214 cc. of nitric oxide.—*Jour. Chem. Soc.*, Nov., 1882; from *Compt. Rend.*, 95, 132–135.

PREPARATION OF PRESSED YEAST.

Hayduck has investigated the utilization of the nitrogenous constituents in the manufacture of pressed yeast. To determine the quantity of nitrogen contained in the raw materials, which can be assimilated by the yeast, the finely bruised substances were extracted with distilled water at 50°, or with dilute sulphuric acid at the same temperature. The total quantity of soluble proteïds was determined in the filtrate, after which the solution was treated with a sufficient quantity of sugar. Seed-yeast was then added, and the nitrogen was again determined after the end of the development. The difference between the nitrogen obtained and the total quantity originally found in the solution gives the nitrogen assimilated by the yeast. From oats, about 38 per cent. proteïds could be extracted with water at 50°; the quantity of assimilable proteïds, however, was only about 16 per cent., so that it was impossible to draw any conclusions from these data as to the utility of the solution in the nutrition of yeast. Maize lost about 12 per cent. of soluble proteïds, of which 7 per cent. was assimilable. Hence, maize proteïn is less soluble in water than the proteïds of oats, but a larger proportion of the former is utilized in the nutrition of yeast. From oats treated with water and lactic acid (0·5 per cent. solution), 60 per cent. of proteïds was dissolved, 31 per cent. being assimilable. Lactic acid has a powerful peptonizing action on oat proteïn, but with maize it seems to be without action. In the case of barley-malt, large quantities of proteïds were dissolved by the treatment with water and ½ per cent. lactic acid. In another experiment, malt and potatoes were mashed together in the proportion of 1 : 24, and the mixture diluted to

12° saccharometer. On analysis, the potato-mash gave 0·1 per cent. dissolved nitrogen, 60 per cent. being assimilable. It is shown that, contrary to the opinion usually held, this solution is well adapted to the growth of yeast.

Delbrück describes the employment of potatoes in the cultivation of pressed yeast. According to the process of Schuster and Burow, the potatoes are steamed, water being previously added. Schuster further uses a small quantity of sulphuric acid. The pressure is maintained at a moderate degree. Burow recommends to introduce into the steamers first the potatoes, then the necessary quantity of water, and finally the requisite quantity of bruised maize. The effect of the addition of a small amount of sulphuric acid is not only to improve the color, but to prevent the formation of bacteria.

Birner recommends the use of asparagin as nutriment for the yeast cell; for this purpose leguminous seeds are steamed and added to the mash.

Schuster proposes to prepare pressed yeast and spirit from unbruised corn without the application of steam pressure. The corn is digested with sulphuric acid at 40° (100 kilos. corn, 660 cc. pure sulphuric acid, and 200 liters water). After the expiration of 48 to 60 hours the material is brought into a mashing vat and ground to a fine powder, which is effected with great ease. The saccharification is more rapid and complete.

Hayduck has studied the influence of alcohol on the development of yeast. Fusel oil was found to retard considerably the progress of the fermentation of yeast. 0·5 per cent. amyl alcohol in a 10 per cent. solution of sugar impeded its progress, while 2 per cent. completely prevented the fermentation. Alcohol arrests the fermentation if present to the extent of 15 per cent. by volume, and smaller quantities retard the action. The fact that the formation of yeast is usually completed after the expiration of about 30 hours is explained either by the consumption of an ingredient in the mash indispensable to the development of yeast, or by the formation of a fermentation product which prevents the further progress of the yeast. It was also found that a solution of potato-mash containing 9·25 per cent. (by volume) of alcohol showed signs of fermentation after filtration and addition of yeast, but did not develop yeast. After the removal of alcohol from another portion of the filtrate by distillation, adding water to make up the solution to the original volume, and treatment with yeast, a further

growth occurred with consnmption of nitrogenous constituents. In conclusion, it is mentioned that the assumption that potato-mash is deficient in nitrogenous nutrients is disproved by these experiments.—*Jour. Chem. Soc.*; from *Dingl. Polyt. J.*, 244, 448–456.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

The leaves of Globularia Alypum contain, according to E. Heckel, fat, wax, tannin, globularin, cinnamic acid, mannit, glucose, resins, gummy and coloring matters, 2·1 per cent. of ash, 26·2 water and 13·1 cellulose. The globularitannic acid of Walz was a mixture of tannin and coloring matter. Globularin is a glucoside, but does not yield paraglobularetin; globularetin is at first oily or resinous, gradually becomes transparent and amorphous, and when dissolved in hot alkaline solutions combines with the elements of water, forming cinnamic acid. A small quantity of a volatile aromatic compound, probably benzyl cinnamate, was likewise found in the leaves.—*Comp. Rend.*, cv, p. 90–93.

The leaves of Tarchonanthus camphoratus, nat. ord. Compositæ, yield to hot alcohol a crystalline substance which, after washing with cold alcohol and recrystallizing, was found by F. Canzoneri and G. Spica to have a silvery lustre, to melt at 82°, solidify at a slightly lower temperature, and afterwards melt at 72°C. It is tasteless, insoluble in water, freely soluble in hot but sparingly soluble in cold alcohol, resists the action of acids and alkalies, and burns, giving off the odor of wax. It is probably a homologue of myricyl alcohol, and contains 50 or more atoms of carbon. The authors call it *tarconyl alcohol.* Alcohol takes also up a heavy dark-colored oil, having a pungent taste, and consisting mostly of an ether of an aromatic acid. The plant is indigenous to Southern Africa.—*Gazzetta*, 1882, p. 227.

Fat of the California Laurel, Umbellularia (Oreodaphne, *Nees;* Tetranthera *Hook. et Arn.*) californica, *Nuttall.*—The volatile oil obtained from the leaves was examined by J. P. Heamy ("Am. Jour. Phar.," 1875, p. 105). J. M. Stillman and E. C. O'Neill have extracted from the seed, by means of ether, a tallow-like fat, melting at 31° to 32°C., having in the melted state the specific gravity 0·925, and possessing a disagreeable irritating taste, which is probably due to a little

free acid. The fat is sparingly soluble in alcohol, but dissolves freely in ether and benzol. It contains a new fatty acid, *umbellulic acid*, of the formula $C_{11}H_{22}O_2$, melting between 31° and 34°, and when heated emitting a disagreeable irritating odor. The pure acid is white crystalline, irritating to the mucous membranes of the throat, boils under ordinary pressure between 270° and 275°C., and distils without decomposition.—*Amer. Chem. Jour.*, iv, 206–211.

The presence of asparagin in leaf buds was announced by J. Borodin ("Bot. Zeitung," 1878, p. 802), and has been verified by E. Schulze and J. Barbieri, who found it in the extracts obtained from the young leaves of birch, horse chestnut and plane trees; the latter yielded also ·5 to 1 per cent. of *allantoin*, calculated for the dry leaves; but urea could not be detected. The horse chestnut leaves contained, besides a small quantity of asparagin, also *leucine.*—*Jour. Prakt. Chem.*, xxv, 145–158.

Cholesterin in plants was first discovered by Beneke in 1862, and his observation was confirmed by Hoppe-Seyler, Hesse and others. E. Schulze and J. Barbieri have isolated from Lupinus luteus, *Lin.*, two modifications of cholesterin, one from the cotyledons, the other from the shoots, which they propose to call *caulosterin*. The following varieties of cholesterin have thus far been described: 1, ordinary cholesterin, melting point 145° to 146°C.; 2, phytosterin (O. Hesse), m. p. 132° to 133; 3, paracholesterin (Reinke and Rodewald), m. p. 134° to 134·5°; 4, caulosterin, m. p. 158° to 159°C., and 5, isocholesterin, m. p. 138° to 138·5°. All except the latter are lævorotatory, and give the characteristic color reaction with chloroform and sulphuric acid.—*Ibid.*, 159–180.

Bulgarian Opium.—The cultivation of the opium poppy in Bulgaria has been introduced under the auspices of the medical council and of the Secretary of the Treasury, the latter having distributed seeds as late as 1879. A. Teegarten reported in 1881 (see "Am. Jour. Phar.," 1881, p. 307) on the opium obtained in the Lowtscha district in 1880. Since that time several Macedonians who were practically acquainted with the preparation of opium were engaged, and the author now describes the following samples thus obtained.

Opium from Kuestendil is in hemispherical cakes, weighing from 120 to 300 gm. While still soft the opium is formed into balls, which are laid upon grapevine leaves and covered with the same leaves so as to

leave the sides free. The cakes have an exceptionally strong narcotic opium odor, are externally brown, internally lighter, very dry (moisture 7·63 per cent.), and show upon the fractured surface a large number of small tears of the size of a millet grain to that of a lentil. The taste is very bitter; water takes up nearly two-thirds of the weight of the opium, yielding a clear brown solution of an acid reaction and acquiring a dark red color with ferric chloride. The ash amounts to 2·69 per cent.

Opium from Lowtscha is in irregular oblong or quadrangular cakes, weighing 100 to 200 gm., and covered with green leaves; the tears upon the fracture are less distinct, and the powder is of a lighter color than the preceding. Moisture 10·39, ash 2·36 per cent.

Opium from Hatitz is in round, somewhat convex cakes, about 13 centimeters in diameter, and 2 centimeters thick near the centre. The cakes are covered with small leaves and are of a rather light brown color; the aqueous solution is of a lighter color, has a less distinct acid reaction, and filters less readily than the two preceding samples. Moisture 10·86, ash 2·85 per cent.

Calculated for dry opium, the different varieties yield for 100 parts:

	Kuestendil.	Lowtscha.	Hatitz.
Ash,	2·63	2·63	3·2
Morphine,	20·73	13·28	8·13
Other principles soluble in water,	47·54	50·58	40·85
Insoluble in water,	31·73	36·14	51.02

—*Phar. Zeits. Russl.*, 1882, Oct. 3, 747–752.

Macleya cordata, a papaveraceous plant of Japan, contains, according to Eykman, two alkaloids, of which one is identical with sanguinarine, the other apparently with protopine.—*Ibid.*, p. 757, *Arch. d. Phar.*

Wine made from Unripe Grapes was found by F. Musculus and C. Amthor to contain abnormally large proportions of extractive matter, acids, ash, and phosphoric acid and a small amount of alcohol. The extractive is gelatinous and probably contains pectin compounds. The authors conclude that during the ripening of the fruit the greater portion of the mineral constituents pass into the stem.—*Zeitschr. Anal. Chem.*, xxi, 192.

Pistacia Resin, which has recently appeared in commerce, is obtained from Pistacia terebinthus and, according to Christy, is well adapted for varnishes. It is light-yellow, soluble in fixed oils, oil of turpentine and alcohol, has a mastich-like odor and, mixed with common

resin, is not affected by a 25 per cent. solution of soda. The varnish dries rapidly in the air and is well adapted for painting upon glass and porcelain.—*Phar. Zeits. Russl.*, Oct. 3, 1882, p. 75. from *Jour. Phar. Chem.*

The Poisonous Constituents of Tobacco Smoke (see also this volume p. 492), according to R. Kissling, are carbonic oxide, sulphuretted hydrogen, hydrocyanic acid, picoline bases and nicotine, the first three being present in too small a proportion, and their volatility being too great for exerting any important influence. The picolines are likewise present in relatively small quantities and the toxic action of tobacco smoke is mainly due to nicotine, of which but little is destroyed in smoking cigars.—*Dingl. Polyt. Jour.*, vol. 244, p. 234–246.

Effect of Potassa upon Strychnine.—H. Goldschmidt observed that on melting 1 part of strychnine with 10 parts of potassa and a little water a milky liquid having a chinoline-like odor distils first, afterwards heavy yellow drops, which partly congeal in the condenser. This substance is decomposed by dilute acids yielding a compound agreeing in its reactions with *indol.*—*Chem. Ztg.*, 1882, No. 61, from *Berichte*, xv, 1977.

Stains of Cinchonic Red.—

To the Editor of the American Journal of Pharmacy:

Having found the red stain produced by tincture cinchona comp. upon bottles in which it is kept very difficult to remove, I have experimented with several solvents, and, taking advantage of the well-known solubility of cinchonic red in alkalies, have found that the ordinary strength aqua ammoniæ dissolves it at once and completely, no matter how old or dry it may be.

Yours, etc.,

HENRY H. WETHERILL, M.D., PH.G.

Pennsylvania Hospital for Insane, 50*th and Haverford road,*
November 14, 1882.

VARIETIES.

UNGUENTUM NAPHTHOLI.—Prof. Kaposi uses in skin diseases an ointment composed of naphthol 15, prepared chalk 10, soft soap 50, and lard 100 grams.

LINIMENTUM NAPHTAOLI, used in eczema crustosum of the scalp is made by mixing one part of naphthol with 100 parts of a fat oil like almond, olive, or cod liver oil.—*Wien. Med. Wochenschr.*

BURNT ALUM IN AGUE.—Bamboo Brojendra Nath Banerjee states that this is a very cheap, easily procurable, and efficient antiperiodic medicine. The value of alum is chiefly marked in cases of fever in which the attacks come on with clock-work regularity. It generally fails in irregular types of intermittent fever. Two doses are generally sufficient to complete the cure. Eight grains of burnt alum are to be given in each dose. The first dose is to be given three hours and the next an hour before the expected attack of fever.—*Indian Med. Gazette; Louisville Med. News*, Sept. 30.

SULPHURETTED HYDROGEN IN TUBERCULOSIS.—Prof. Arnoldo Cantani has been experimenting with sulphuretted hydrogen in the treatment of tuberculosis. The reputation of certain sulphur springs, as well as the known properties of the antiseptic, led him to regard the treatment as hopeful. He administers the gas partly in solution and partly by inhalation in a special chamber. He finds so far, that (1) the inhalation of an atmosphere strongly impregnated with sulphuretted hydrogen can be well borne for a considerable time by most patients, and those who find it irksome at first soon get accustomed to it; (2) the patients usually become free of fever in a day or two; (3) the local changes appear not to increase, and the cough becomes less.—*Centralb. f. Med. Wissensch.; Louisv. Med. News*, Sept. 30.

POMADE FOR COMEDONES.—The St. Louis "Medical Journal" says that Una, in "Virchow's Archives," recommended the following for comedones: Kaolin, four parts; glycerin, three parts; acetic acid, two parts, with or without the addition of a small quantity of some etherial oil. With this pomade he covers the parts affected in the evening, and if need be during the day. The comedones can be easily expressed after several days, most of them coming out by washing the parts with pumice-stone soap.—*Chic. Med. Review*, Oct 15.

GLACIALIN.—According to Dr. Besana, this substance, which has met with so much favor in England and elsewhere as an antiseptic, especially for the preservation of milk, meat and other articles of food, has the following composition: Boracic acid, 18 parts; borax, 9 parts; sugar, 9 parts; glycerin, 6 parts. A Roman composition of a similar kind was found to be nothing but pure boracic acid. It is called salt of glacialin, and sells at five francs per kilogram (about forty-five cents a pound), the market price of boracic acid being exactly half that rate.—*Boston Journal of Chemistry.*

Salicylate of Sodium for Sore Throat.—After a large number of observations Dr. Robt. N. Hormazdji, of Cheltenham, has come to the conclusion that in all acute cases of *tonsillitis* salicylate of sodium is a specific, while in chronic cases it seems to possess no effect whatever. He recommends about 15 grains of the remedy every hour, till the most urgent symptoms are relieved, when only half the dose is administered. At the same time he employs a gargle, consisting of about 10 grains of the salicylate of sodium, 1 ounce of glycerin and 3 ounces of water. He found the remedy especially specific in its effect in very acute and severe cases, as also in the angina of scarlatina, and of erysipelas.—*Med. and Surg. Rep.*, Oct. 28.

Resorcin in Cholera Infantum.—Dr. M. Cohn, in his inaugural thesis at Stuttgart ("Centralbl. f. d. Med. Wissen.," 1882, p. 512) speaks of the effect of resorcin in cases of cholera infantum. He made use of a solution of 0·3 (5 grains) resorcin, 6 drachms of water and about two drachms of simple syrup. He observed no disagreeable side effects, and of 35 children who had suffered from summer complaint 30 rapidly regained their health. These observations were made at the University clinic for diseases of children, in Stuttgart. In no case was noted any bad results, and Cohn considers this remedy almost a specific in catarrhal inflammatory conditions of the alimentary canal in children. He found it also uniformly successful in all cases of stomatitis, aphthæ, etc.—*Med. and Surg. Rep.*, Oct. 28.

Astragalus Mollissimus.—Among the plants destructive to cattle in the West ("Weis Remedies," 1882) is the Astragalus Mollissimus, whose physiological action has been recently studied by Dr. Isaac Ott, of Easton, Pa. He summarizes it as follows: It decreases the irritability of the motor nerve, greatly affects the sensory ganglia of the central nervous system, preventing them from readily receiving impressions. Has a spinal tetanic action. It kills mainly by arrest of the heart. Increases the calloary secretion. Has a stupefying action on the brain. Reduces the cardiac force and frequency. Temporarily increases arterial tension, but finally decreases it. Greatly dilates the pupil.—*Chic. Med. Review*, Oct. 15.

Hyoscine, prepared by Ladenburg, and crystallizable by hydriodic acid, has proved to possess, if dropped into the eye, a remarkably rapid mydriatic effect, and surpasses in this respect atropia in a high degree. But the solution should be only a half per cent. one, as stronger solutions (one and a half per cent.) cause already general symptoms, as unconsciousness, disturbances of articulation, vertigo, and dryness of the throat. It may be mentioned that this preparation seems to be well tolerated by the conjunctiva, even if kept a long time in contact with it.—*Medical Press; Louisv. Med. News*, Nov. 4.

Strychnine in Alcoholism.—According to M. Luton, of Rheims, ("Bulletin de Therapeutique"), says the "Medical Record": One may observe in alcoholics a veritable excito-motor inertia of the spinal cord, capable of lessening the generally so marked effects of strychnine. Thus in individu-

als suffering from acute alcoholism this drug may and must be given in large doses to insure success. While in some cases three centigrams of sulphate of strychnia injected by demi-centigrams in the course of a day, suffice to relieve an attack of delirium tremens, in other instances more will be required. To an individual affected with delirium tremens, symptomatic of a varioloid, M. Luton has given hypodermically in fifteen hours, seven centigrams of strychnia sulphate, with real benefit and without accidents of strychnism. M. Luton is of the opinion that in the alcoholic, because of an acquired tolerance, there is no absolute limit to the employment of strychnine. The principal point is to divide the dose so as not to inject more than a centigram at a time. An interval of two hours suffices to exhaust the primitive or dangerous effects of the poison. It is necessary also to watch the patient closely, and to stop the remedy as soon as the delirium has ceased, and sleep has appeared, for from this time on inertia of the cord no longer exists, and the cumulative effects of the drug might otherwise suddenly manifest themselves.—*Chic. Med. Rev.,* Nov. 1.

PELLETIERINE TANNATE.—Dr. Berenger-Feraud ("Bulletin Générale de Therapeutique," translated in the "Medical Times") communicates the results of the various kinds of treatment for the removal of the tapeworm: Oil of turpentine, male fern, pumpkin seed, kooso, pomegranate root bark and pelletierine tannate. This last he considers the most powerful of all agents, as complete success was obtained in forty-six per cent. of the cases. As soon as proof of the presence of the intruder is obtained the patient is put upon milk and bread for the next two meals. On the next morning before rising an infusion of ten grams of senna leaves in one hundred grams of water sweetened with thirty grams of syrup of orange peel is administered. An hour later the patient takes half the dose of pelletierine diffused in twice its weight of water. The patient should lie still with closed eyes to prevent nausea and vomiting. Half an hour later the rest of the drug is given. After another half hour thirty or forty grams of castor oil are given. Should there be no stool an hour afterward purgative enemata are given. Success in this treatment appears to lie in the rapidity of the purgation.—*Chic. Med. Rev.*, Oct. 15.

THE POISON OF MUSHROOMS.—Prof. Roufick, of Breslau, has lately made experiments on the common mushroom, of which the following, published in the "British Medical Journal," are the results: All common mushrooms are poisonous, but cooking deprives them, more or less, of their poisonous qualities. The repeated washing with cold water which they usually undergo to clean them takes away a portion of the poison, and boiling does the rest; but the water in which they have been boiled is highly poisonous, and should be carefully gotten rid of. Experiments made on dogs showed that if a dog ate one per cent. of its own weight of raw mushrooms it fell sick, but recovered; if it ate one and a half per cent. the poison has a more violent but not fatal effect, and if it ate two per cent. it was inevitably fatal. The water in which mushrooms had been boiled was far more poisonous than even the raw mushrooms, while the mushrooms thus boiled could be taken without hurt to the amount of ten per

cent. of the weight of the dog's body. Washing with cold water does not remove all the poison, so that mushrooms thus prepared are poisonous when taken in larger quantities. Dried mushrooms are still dangerous for from twelve to twenty days, and also the water in which they have been boiled. They require to be dried for at least a whole month, and are only really safe after four months' drying.—*Chic. Med. Review*, Oct. 1.

NUTRITIVE VALUE OF SOUPS AND BROTHS.—The distinguished German Professor Virchow has been accused of being the chief opponent of soup. He says ("Scientific American") that this is not true, for he had merely said that meat broths are neither nutritious nor "substantial." That if all the meat which one uses should be boiled and soup made of it, the meat would become for the greater part indigestible, and the soup would not be a substitute for it. Ordinary meat broth or bouillon in its pure form can only be recognized as a condiment. By the addition of eggs, flour, fat and other things it may acquire a certain nourishing and heating value. It is, primarily, only a very dilute aqueous solution of substances that are in part of low value as heat producers, such as gelatin, and in part of the stimulating aromatic parts of the meat. Taken warm, it is of nearly the same value as coffee or tea, but is inferior to wine, schnapps or beer; it only stimulates the nerves. It has one advantage over every other condiment, namely, it contains no poisonous substance, it is incomparably milder, hence much better adapted to feeble persons; and finally, it can be very conveniently combined with substances that are actually nutritious, and imparts to them an agreeable and substantial taste.—*Chic. Med. Review*, Oct. 1.

MILK POWDER IN GASTRIC AFFECTIONS.—The "Medical Times and Gazette" says that Dr. Debove, in a communication to the Paris Hospital Medical Society, "Gaz. Hebdomadaire," August 25th, observes that the milk regimen, which is so indispensable in affections of the stomach, and especially simple ulcer, speedily becomes so disgusting to these patients that it has to be left off. This serious inconvenience, however, may be remedied by the employment of the œsophageal tube now used for feeding phthisical patients. But by this only a liter of milk can be introduced at a time, so that it would require to be employed six times in order to introduce the six liters, which is the mean quantity required for the subjects of *ulcus rotundum*. To avoid this frequent introduction of the tube Dr Debove has had skimmed milk evaporated (cream being but slightly digestible), and the residue reduced to a fine powder. If this be dissolved in warm hot water, two or three liters of milk may be injected in the same volume as a single liter. It is possible that this milk-powder, which furnishes excellent results in gastric affections, may also prove very useful in Bright's disease, cardiac affections, and all cases in which a milk regimen is employed. About a liter of pure milk is represented by 4 ounces of the powder. Dr. Dujardin-Beaumetz observed that in feeding the subjects of phthisis with the tube he has obtained excellent results from a mixture of powder of meat, powder of blood, and powder of milk. As powder of blood is not very digestible, he only adds a small proportion of that as a ferruginous principle.—*Med. and Surg. Reporter*, Nov. 4.

MINUTES OF THE PHARMACEUTICAL MEETING.

In the absence of the President the meeting was organized by calling Mr. A. P. Brown to the chair; the reading of the minutes of the last Pharmaceutical Meeting was proceeded with, and there being no objection, they were, on motion, approved.

A copy of the proceedings of the New Jersey Pharmaceutical Association was presented to the College by the chairman.

Dr. Miller introduced Dr. Formad, of the University of Pennsylvania, who proceeded to address the meeting upon the subject of "Bacteria," describing the four principal forms, explaining the nature of bacteria as fungi, and showing that they played an important part in the decomposition of organic matter.

The lecturer, who illustrated his subject by diagrams and sketches, and by a number of microscopical preparations, was listened to very attentively and was requested to furnish an abstract of the discourse for publication.

At its conclusion Mr. Boring moved, and it was unanimously adopted, that a vote of thanks be tendered Dr. Formad for his kindness in giving the instruction upon so interesting a topic. Prof. Maisch expressed his obligatien to Dr. Formad for the clear manner in which the subject had been laid before the meeting, and which had removed various hitherto doubtful points, so that he believed he could continue this intricate study with greater facility.

Mr. Heinitsh asked the meeting what was the general opinion of the members about the new Pharmacopœia, and in response several objections were raised; one member stated that he formerly trusted a clerk to prepare an article by the directions of the Pharmacopœia, while now he felt obliged to supervise every step of the process and see that all the calculations were correct before he permitted him to proceed with any of the work. Another thought that the work was fitted more for an adept than a learner, that the minutia and exactness of formulæ would tend to throw the work of preparations into the hands of manufacturing pharmacists and thus degrade our business.

There being no further business, on motion, the meeting adjourned.

T. S. WIEGAND, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

THE ALUMNI ASSOCIATION OF THE PHILADELPHIA COLLEGE OF PHARMACY held the second social meeting Tuesday, November 14th, Dr. A. W. Miller in the chair. Dr. Miller exhibited a cabinet of materia medica specimens for the use of students; it is conveniently arranged and provided with labels the blanks of which are designed to be filled while the specimens are examined for study.

Dr. Lautenbach delivered a lecture upon the various theories advanced in explanation of *the cause of disease*, and more particularly upon the influence of germs of various kinds upon vegetable and animal life.

After recitations by Mrs. L. Pearce, teacher of elocution, and Mr. Fink, a number of pharmaceutical specimens were examined and the meeting then adjourned.

THE CALIFORNIA COLLEGE OF PHARMACY held its commencement exercises at the Metropolitan Temple, San Francisco, on the evening of November 1st. After addresses by Mr. John Calvert, President of the Board of Trustees, and by Gen. W. H. Barnes, the President of the University of California, Professor W. T. Reid conferred the degree of Graduate in Pharmacy upon the following candidates: Robert L. Ball, Chas. L. Barrington, Joseph Calegaris, Eugene D'Artenay, Franklin T. Green, Emile Happersberger, Russel H. Judson, Jas. W. Tryon, David Wight, Wilfred M. Young. The first prize, a gold medal, was awarded to E. Happersberger, and the second prize, books of the value of $20, to R. L. Ball; H. Korper, a junior student, received the junior prize, consisting of a ticket for the second course, $50 in value; valedictory addresses were delivered by Professor Searby and by R. L. Ball, Ph.G.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN. At the Pharmaceutical meeting held November 1st the President, Mr. Michael Carteighe, in the chair, a paper by Dr. Thresh on the *Orchard Alum Spring* was read. The spring originates in a disused coal mine near the summit of Axe Edge, the highest point in the Peak country, and derives its name from the strongly astringent taste of the water, and from the farm on the hillside, a bleak and desolate spot known as the orchard. The country people use the water as a vermifuge, and externally for the cure of ring-worm. Dr. Thresh found its specific gravity to be 1·00351 and a gallon of it to contain 298·809 grains of solid constituents, namely: Fe_23SO_4 174·426 gr., Fe_2O_3 6·275 gr., Al_23SO_4 72·908 gr., $MgSO_4$ 21·055 gr., $CaSO_4$ 14·381 gr., $FeSO_4$ 1·596 gr., SiO_2 5·776 gr., and minute quantities of aluminium phosphate, sodium and potassium sulphates, potassium nitrate and chlorides of potassium and ammonium.

Mr. C. Patrouillard had sent a paper on the reducing *action of oxalic acid upon alkaline arseniates*, in which he acknowledged the correctness of Naylor and Braithwaite's observation (see "Am. Jour. Phar.", 1882, p. 533) that free arsenic acid is not affected, but maintained that arseniates boiled with oxalic acid or ammonium oxalate were thus reduced. Mr. Naylor referred to the effect produced by sulphuretted hydrogen and sulphydrate of ammonia upon arsenic acid at different temperatures, and promised further investigations into the conditions pointed out by Mr. Patrouillard.

Mr. J. Bland read a paper on *Tinctura Camphoræ Composita* (Tinct. Opi camph.), directing attention to the greater solubility in proof spirit of the oil of Pimpinella Anisum than of the oil of staranise. In the discussion the varying congealing points of the two oils were alluded to, and, by Mr. Allen, the effect of decreased temperature, which caused the separation of the iridescent scales.

EDITORIAL DEPARTMENT.

THE PURITY OF POWDERED DRUGS.—On pages 527 and 528 of our October number we have briefly reported on a paper read by Mr. Allaire, and on the remarks made on this subject at the meeting of the American Pharmaceutical Association. A valued correspondent, whose position and experience entitle his views to careful consideration, has sent us a lengthy communication, which we are obliged to condense, so as to give to our readers at least the outlines of the different points:

"Mr. Allaire's paper is valuable, because it calls attention to a very great abuse, and because it originated in a portion of the country where some remedy is most required. The distributing trade in drugs near the seaboard tends constantly to fewer hands, and is becoming more and more confined to the supply of the apothecary, whose pursuit from the standpoint of remuneration is followed more as a profession than as an ordinary business. In the interior the business is largely combined with other mercantile branches. Within a year past an eminent chemist analyzed the powdered opium from all the distributing trade in New York city, and with two or three trifling exceptions found all to be above the pharmacopœial standard. At least seven-eighths of all the powdered drugs distributed to the retail trade near the seaboard are strictly faithful (see also editorial remarks on page 588 of November number), and they are obtained from houses whose standing is well known. In various localities drug mills have been established, whose products cannot be sold at home, but are used for supplying the interior trade; these mills probably powder more goods than the regular distributors, and they find a market for sophisticated powders.

"What shall be the remedy? No doubt, the most important consists in the diffusion of correct information; hence, the value of such an organization as the American Pharmaceutical Association. Powdered drugs are pharmaceutical preparations, and all these should never be distributed to the apothecary under an assumed name. Chemicals can be readily tested by the standard of the pharmacopœia, and hence may be fairly put upon the market under the name or guarantee of the distributor; but no pharmaceutical preparation should be. Interior jobbers often purchase powders at less than or near the cost of crude drugs, and then distribute these to the apothecary trade under their own name on the dealer's general reputation as a merchant, for the reason that such goods pay better profits than goods of character, and that they give satisfaction, because accurate investigation is hardly possible. This can only be remedied by the demand that all powders shall bear the label of the manufacturer. Analytical research should be encouraged; but in so difficult a field as that of vegetable substances great care is necessary. As a rule, the most ready analysts are the least reliable, their positiveness being often the result of a want of experience or knowledge of the difficulty of accurate determination."

THE PUBLICATION OF THE PHARMACOPŒIA.—We have thus far refrained from alluding to the awarding of the contract for the publication of the new Pharmacopœia in the hope that something might turn up which would convince us of the incorrectness of our views in relation to the award. Having waited in vain, we shall put on record, as a matter of history, the facts in as brief a manner as possible, and make only such explanations as may seem to be necessary for correctly understanding the figures.

The Pharmacopœia Convention of 1880 instructed the Committee of Revision to award the publication of the Pharmacopœia to the publishing house offering the *best terms;* the committee to hold the copyright; the price of the book to be limited, and the book to be sold *through the ordinary trade channels.* A sub-committee on copyright was appointed by the Chairman of the Committee of Revision, comprising the Finance Committee, Drs. Rob. Amory, E. L. Wood, and Thos. Doliber, of Boston, and in addition, Dr. H. G. Piffard, of New York, and Dr. W. S. W. Ruschenberger, of Philadelphia; the latter, for domestic reasons, was unable to attend the meetings. In the draft of a contract the clause "to be sold through the ordinary trade channels" was not inserted, but in its place it was stipulated that the market shall be kept fully supplied. Nearly all the members of the committee regarded the two sentences as equivalent, and voted in favor of the draft, which also contained various blanks, one of the most important of which was the price at which the book was to be sold. The Committee on Copyright fixed the price at $4, and invited bids, which were received as follows:

Houghton, Mifflin & Co., Boston, royalty offered, one-half the profits.
Hall & Whiting, Boston: 15 per cent. on 15,000 copies in first year; afterwards 20 per cent.
Wm. Wood & Co., New York: 10 per cent., first year's guarantee on 10,000 copies.

J. B. Lippincott & Co., Philadelphia:	41 per cent.,	first	year's	guarantee	on	2,000	copies.
	or 34 per cent.,	"	"	"	"	5,000	"
H. C. Lea's Son & Co., "	30½ per cent.,	"	"	"	"	4,000	"
P. Blakiston, "	26 per cent.,	"	"	"	"	3,000	"

The sub-committee awarded the contract to Wm. Wood & Co., and in informing the general committee merely stated the names of the bidders, and that the successful firm had offered 10 per cent. royalty, but requested permission to withhold information as to the guarantee for the first year, nor did they furnish any details as to the other bids, until after several members of the general committee obtained the facts from the different firms. The contract was finally approved by the following vote:

Ayes—R. Amory, Mass.; P. W. Bedford, N. Y.; F. A. Castle, N. Y.; T. Doliber, Mass.; L. Johnson, N. Y.; J. F. Judge, O.; G. F. H. Markoe, Mass.; O. Oldberg, Mo.; H. P. Parsons, N. Y.; H. G. Piffard, N. Y.; A. B. Prescott, Mich.; C. Rice, N. Y.; O. A. Wall, Mo.; E. S. Wood, Mass., and T. F. Wood, N. C.—15.

Nays—C. L. Diehl, Ky.; L. Dohme, Md.; D. L. Huntingdon, D. C.; J. M. Maisch, Pa.; J. P. Remington, Pa.; W. S. W. Ruschenberger, Pa.; E. Scheffer, Ky.; A. B. Taylor, Pa., and W. S. Thompson, D. C.—9.

Why the committee adjudged that particular bid to be *the best* remains a mystery to the present day. It cannot be on the ground of the royalty offered for the *largest number of copies* during the first year; for in this

respect Hall & Whiting were 4,000 copies ahead of Wm. Wood & Co. It can also not be on account of the *largest sum* derived from the royalty of the first year; for against $4,400 from Wm. Wood & Co. this would have yielded from Hall & Whiting, $9,000; J. B. Lippincott & Co. (34 per cent.), $6,800; H. C. Lea's Son & Co., $4,880, which sums equal respectively 22,500, 17,000, and 12,400 copies during the first year at the royalty of Wm. Wood & Co.

It is estimated that the total sales of the Pharmacopœia previous to the next revision will be from 15,000 to 20,000 copies. The total difference in royalty can be easily calculated, when it is remembered that Wm. Wood & Co. pay on each copy 40 cents, while Hall & Whiting offered 60 cents, P. Blakiston $1.04, H.C. Lea's Son & Co. $1.22, J. B. Lippincott & Co. $1.36 or $1.64.

But there is still another aspect to this transaction. The price has been fixed at an unusually high figure. Hall & Whiting therefore suggested in connection with their bid, that the retail price should be $3.75, *at the highest.* H. C. Lea's Son & Co. submitted, in sealed envelopes, two additional bids, based upon a retail price respectively of $3.50 and $3.00, which bids were not considered. The unusually high price of the book is most forcibly illustrated by the following letter addressed to Dr. Amory, the chairman of the sub-committee, in explanation or the bid of Houghton, Mifflin & Co.: "If the book had been placed at $4, with the usual 25 per cent. discount to the trade, our bid would have netted the Association (*i. e.*, the committee) a dollar a copy for each copy sold, and, as I estimated yesterday, if there were ten thousand copies sold, which I thought a reasonable number, it would have given them $10,000 the first year." In other words, the cost of getting up the first 10,000 copies averages $1 per copy; the trade discount on the retail price of $4 is $1, leaving a clear profit of $2 on each copy sold. The chairman of the sub-committee adds, in Circular No. 133, that "these explanations were not given until Friday, the 13th" (Thursday, April 13?), and that therefore the sub-committee cannot be taken to task for not being able to have taken advantage of Mr. Houghton's offer."

Further comments appear to be unnecessary.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The Pharmacopœia of the United States of America. Sixth Decennial Revision. By authority of the National Convention for Revising the Pharmacopœia, held at Washington, A. D. 1880. New York: Wm. Wood & Co.. 8vo, pp. 520.

In announcing the appearance of this work due praise should be accorded to the untiring and well-directed labor performed by the Chairman of the Committee of Revision, Dr. Chas. Rice, of New York, which alone made the early publication possible, through systematizing the work performed by the individual contributors.

A critical review of the Pharmacopœia would at the present time be premature, since for many of the formulas the experience of the apothecary will be required before their possible defects may become known. We

shall content ourselves now merely to direct attention to the more important changes.

The division of the old Pharmacopœia into a primary and secondary list of drugs, and into preparations, has been abolished, and a single alphabetical arrangement adopted, similar to that of the British Pharmacopœia, and except in nomenclature to that of nearly all the European Pharmacopœias. The drugs derived of the vegetable and animal kingdom are now concisely described as to their physical, and, wherever it was deemed necessary, also their important structural or chemical characteristics.

Processes for preparing chemical compounds have been omitted, except in a few cases; but each chemical is defined according to its formula, its physical properties, chemical reactions and possible impurities or adulterations.

In the formulas for pharmaceutical preparations definite quantities have been discarded, except where necessary on account of the dose, as for the preparation of pills, the quantities being given in grains and grams; for citrate of magnesium, in grains and grams, fluidounces and cubic centimeters; for fluid extracts, in grams and cubic centimeters, etc. The change made in the last-named case we consider as particularly inopportune, inasmuch as it differs from the general plan of the work to make all preparations by weight, and as it introduces a new relation of weight to measure hitherto unknown in American pharmacy; in our opinion, these preparations could have been easily and conveniently made to represent the drug weight for weight; but if a definite and uniform relation of weight to measure was considered absolutely necessary, it would have been far better to leave the old relation undisturbed, instead of adopting a measure which, if the discarding of measures be found of the convenience and exactness that is claimed for it, must necessarily involve another change in the near future.

Pending the general introduction and use of the metric system, American pharmacy must necessarily be in a state of transition, which has been recognized in the formulas for pills, where grains and their equivalents in grams are given, but discarded in those for fluid extracts where only gram weights are given for solids and liquids, except that the final product is to measure so many cubic centimeters. The present fluid extracts are about 5 per cent. weaker than those of the last Pharmacopœia.

Considering the fact that the spelling of the metric unit of weight, *gram*, is steadily gaining ground in England, we can now, less than heretofore, approve of the determination of the majority of the committee to make it *gramme*. Our preceding volume contains five or six papers presenting the arguments for both forms of orthography.

The practice so long adhered to in the United States of terminating the names of the organic alkaloids in *ia* or *ina* has met with little favor elsewhere, and even here it was not followed consistently. The Pharmacopœial plan of making the Latin names of the alkaloids ending in *ina*, and the English names in *ine*, and the names of the neutral or rather non-alkaloidal principles, respectively, in *inum* and *in*, is a very commendable one.

The Pharmacopœia proper is followed by a list of reagents and various tables, several of which have no relation whatever to the Pharmacopœia as a *law book*, no matter how convenient they may be for reference. One of the most important and necessary tables is that on pp. 454, 455, giving approximately the differences of strength of the more important preparations of the last and present Pharmacopœia.

We hope at an early date to enter more minutely into the merits of the different preparations, and solicit from our readers communications giving their experience with the working formulas and other matters of the new Pharmacopœia, which we hope will without delay become the guide in matters pharmaceutical throughout the country. In this connection we wish to state our regret that none of the members of the Committee of Revision thought of it in time before the book was placed upon the market to issue it with the recommendation that it be generally adopted for the dispensing of medicine *from a definite time*, say January or March 1, 1883. We would suggest that such a course be agreed upon after a new revision.

Pharmacopœa Germanica. Editio altera. Berolini: Apud R. de Decker (Marquardt & Schenck), 1882. 8vo, pp. 366.

The German Pharmacopœia. Second edition.

By the Chancellor's edict of July 8, 1882, the use of this new Pharmacopœia, which is published in the Latin language, becomes obligatory throughout the German Empire from January 1st next. The general arrangement remains the same as in the previous edition; obsolete drugs have been dismissed and new ones introduced. The descriptions of crude drugs are concise and the tests brief and to the point; the same may also be said of the chemicals. The galenical preparations are in the main made as heretofore; wherever extraction is necessary, it is performed by maceration, not by percolation, as with us. The directions are, as a rule, quite brief, and it is not considered necessary to enter so minutely into the details of the different processes as is customary in our Pharmacopœia. The formulas are partly (most syrups) constructed upon 100 parts of finished product; but in other classes of galenicals, like ointments, tinctures, species, wines, etc., this plan has not been followed, though in many cases the values given are easily convertible into 100 parts of the finished preparation (ointments and species), or of the menstruum (tinctures, wines).

In future numbers we propose giving the more important formulas of this, compared with similar ones of our new Pharmacopœia.

A Guide to Therapeutics and Materia Medica. By Robert Farquharson, M.D., Edin., etc. Third American edition, revised by the author. Enlarged and adapted to the U. S. Pharmacopœia, by Frank Woodward, M.D., Physician to the German Hospital Philadelphia. Philadelphia: Henry C. Lea's Son & Co., 1882. Royal 12mo, pp. 526.

As a convenient and reliable work of reference this "Guide" is duly appreciated by physicians, two editions having been exhausted within five years. The general plan and internal arrangement has been preserved in the present edition, and much care has evidently been bestowed upon it,

both by the author and editor. That its external appearance is in keeping with its valuable contents needs scarcely be mentioned.

The alphabetical list of drugs is followed by a smaller one, covering 32 pages, and embracing drugs which we think should have been included in the first list, because nearly all are recognized by the British and by the last or present United States Pharmacopœia. We notice with pleasure that the chemically incorrect name, propylamine, which is still largely used in prescriptions, has been discarded in favor of the correct name, trimethylamine; but we are rather surprised that on page 458 a secret preparation is noticed.

On page 188 it is stated that tea, coffee, guarana and *coca* contain caffeine; in place of the latter *maté* should have been mentioned. On page 148 the statement of former editions is repeated, that angustura bark "has fallen into disrepute from the fact that it was occasionally found to be accidentally adulterated or mixed with nux vomica bark." We have pointed out before ("Am. Jour. Phar.," 1879, p 334) that this is erroneous, there being but one substitution on record, dating back to the beginning of the present century. Perhaps the author had in view the false angustura bark which we described in 1874 (*ibid.*, 1874, p. 50), and which Oberlin and Schlagdenhauffen (*ibid.*, p. 414) subsequently proved to have been obtained from Esenbeckia febrifuga, *Martius;* but though this bark has a slight resemblance to the nux vomica bark, and, like the latter, is not aromatic, but bitter, it is not poisonous, but is or has been used throughout France in place of true angustura bark.

Rheumatism, Gout and some Allied Disorders. By Morris Longstreth, M.D., one of the attending physicians of the Philadelphia Hospital, etc. New York: Wm. Wood & Co., 1882. 8vo, pp. 280.

This forms the tenth volume of the current series of Wood's Library of Standard Medical Authors, and treats exhaustively of the diseases mentioned on the title-page, describing their varieties, causes, pathology, complications, morbid anatomy, diagnosis, prognosis and treatment.

The Medical Record Visiting List or Physicians' Diary for 1883. New York: Wm. Wood & Co.

It contains lists of doses for internal and subcutaneous use, and for inhalation, notes on disinfectants and antiseptics, on urinary analysis, on antidotes to poisons, etc.

Proceedings of the First Annual Session of the Alabama Pharmaceutical Association, held at Mobile, May 8. 8vo, p. 19.

Proceedings of the Twelfth Annual Meeting of the New Jersey Pharmaceutical Association, held in Atlantic City, May 17 and 18, 1882. Camden, N. J. 8vo, pp. 106.

Proceedings of the Wisconsin Pharmaceutical Association, held in Oshkosh, Aug. 8, 9 and 10, 1882. Third Annual Meeting. Janesville. 8vo, pp. 79.

Brief accounts of these meetings will be found on pages 326, 329 and 474 of the present volume. The second pamphlet contains an excellent phototype portrait of the late Chas. H. Dalrymple; and to the last is appended the first report of the Wisconsin State Board of Pharmacy.

INDEX

TO VOL. LIV (VOL. XII, FOURTH SERIES), OF THE AMERICAN JOURNAL OF PHARMACY.

EECKELAER'S
TOILET SOAPS.

We would call the attention of druggists and of dealers in Toilet articles to the following line of soaps, manufactured by L. Eeckelaers, of Brussels.

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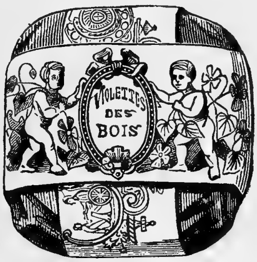

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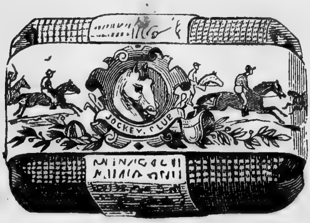

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LECTURES

IN THE

PHILADELPHIA COLLEGE OF PHARMACY.

Sixty-First Session of the School of Pharmacy,

1881-82.

The Lectures in this Institution will commence on Friday, September 30th, and terminate about the first of March. They will be held in the Hall of the College, Tenth street above Cherry.

On Monday, Wednesday and Friday Evenings to the SENIOR CLASS,

—AND ON—

Tuesday and Thursday Evenings and on Saturday Afternoon to the JUNIOR CLASS.

The LECTURES ON CHEMISTRY will embrace, in a systematic view, the laws, operations and results of this Science, and its relations to Pharmacy. The elements concerned in inorganic nature, and their compounds, will receive such notice as their relative importance in this respect demands; and will be illustrated by experiment, diagrams, specimens and processes.

Organic Chemistry will also receive its full share of attention, and all its compounds possessing general or Pharmaceutical interest will be brought under consideration in a similar manner.

The LECTURES ON PHARMACY will treat of the elementary operations required in the preparation of medicines, viz., weights, measures and specific gravity the management of heat, the manipulations in the processes of pulverization, solution, evaporation, distillation, crystallization, &c.; all illustrated by the most approved models, diagrams and apparatus.

In connection with this the officinal and some unofficinal preparations will be classified and described, and their proportions, properties and doses exhibited. The organic acids, alkaloids and neutral principles prepared by the chemist and pharmacist, together with the processes for their manufacture, will be described, and their properties, uses, applications and the tests of purity explained.

The branch of Extemporaneous Pharmacy will claim attention during the course, and will embrace the construction of formula and prescriptions, technical language and abreviations, and the art of combining medicines into eligible forms, together with the consideration of the various apparatus and implements which are required for the successful practice of the art of dispensing medicines.

The LECTURES ON MATERIA MEDICA will be exclusively devoted to vegetable and animal substances, and will aim mainly to present the leading characteristics of each individual drug. The physical characters of drugs, their structure and chemical relation will therefore occupy most of the course, while their botanical and commercial history will receive their full share of attention, as well as the proximate principles upon which the medicinal virtues of each depend, and a concise view will be given of their medical properties, the officinal preparation and doses of the same.

The extensive cabinet and herbarium of the College, as also the private collection of the Professor, together with plates and drawings, will furnish ample means for illustration, to be aided by experiment wherever it is deemed necessary.

The LECTURES ON BOTANY will commence in April. The course will embrace general and special morphology, organology, and a concise view of systematic botany embracing the characteristics of those natural orders and genera which are of greatest importance to the Pharmacist. Wednesday afternoon of each week will be devoted to these lectures and to excursions into the surrounding country, affording healthful recreation, and the best means of becoming practically acquainted with the living plants.

PHILADELPHIA COLLEGE OF PHARMACY,

145 North Tenth Street.

Sixty-second Session, 1882-83.

—FACULTY:—

JOHN M. MAISCH, PHAR.D.
Professor of Materia Medica and Botany.

JOSEPH P. REMINGTON, PH.G.
Professor of Theory and Practice of Pharmacy.

SAMUEL P. SADTLER, PH.D.
Professor of Chemistry.

FREDERICK B. POWER, PH.D.
Professor of Analytical Chemistry.

ASSISTANTS TO THE PROFESSORS:

JOHN E. COOK, PH.G., Materia Medica and Botany.
C. FREDERICK ZELLER, PH.G., Theory and Practice of Pharmacy.
HENRY TRIMBLE, PH.G., Chemistry.

The Lectures of the regular course of instruction in this College will begin **MONDAY, October 2d, 1882,** and will terminate about March 1st, 1883.

Two Lectures will be delivered to the **SENIOR CLASS** on each Monday, Wednesday and Friday evening, and to the **JUNIOR CLASS** on each Tuesday and Thursday evening and Saturday Afternoon.

The subjects treated of in the Lectures are those of MATERIA MEDICA (PHARMACOGNOSY), BOTANY, THEORETICAL AND PRACTICAL PHARMACY, PHYSICS AND CHEMISTRY.

Field Instruction in Practical Botany will be given by PROF. MAISCH, on Wednesday afternoons, beginning April 19th. All Students and Graduates of the College are invited to attend, and participate in the Botanical excursions to the surrounding country.

The Pharmaceutical Laboratory, under the superintendence of PROF. REMINGTON, will be open to receive Students in October, with increased facilities for accommodating the rapidly growing Classes.

The Chemical Laboratory, under the direction of PROF. POWER, will be open daily to receive special Students, during the Regular Session, beginning in October, and during the spring and summer from March to August 1st. Students are received at any time for individual instruction.

Class Instruction in Analytical Chemistry will also be extended to all desiring it, and this new feature will doubtless be largely taken advantage of when the Regular Session opens.

Fees for Lecture Tickets, ...	***$36.00***
Matriculation Fee for Students apprenticed to members of College, ...	***2.50***
For other Students, ...	***5.00***

Three Free Scholarships will be granted during each Session. Six prizes, including three Gold Medals, will be awarded at the end of the Course. Students of this College have access to the extensive Library and Museum on the ground floor of the building. A full sketch of the scope and character of the instruction may be seen in the announcements, which will be freely furnished on application to the Actuary, THOS. S. WIEGAND, or either of the Professors.

A WORD

To those Interested in the

Defense of the Rights of the Public, Science and Medicine.

Since the year 1877 we have lost no opportunity to place before the professions of Medicine and Pharmacy the injury which was resulting to public, professional, and scientific interests, through the abuse of the laws relative to patents and trade-marks, by certain manufacturing pharmacists, or patent medicine dealers, working under the title of "Manufacturing Pharmacists." We have sought and expected a reply to, or counter-attack upon, our efforts, without satisfaction, until recently one Horatio R. Bigelow, M. D., has appeared as the mouthpiece of the patent medicine ring.

A recent and specially enlarged edition of a journal published in Sandyhook, Conn., the *New England Medical Monthly*, contains an article in the interests of the ring, by the above named physician, severely attacking the reputation and policy of our house. We understand that pecuniary aid has been given to this undertaking by those interested. As this article seems to be the concentrated and final effort of our opposers we desire to call the attention of physicians and pharmacists to the fact, and to our expressed willingness to send, *post-paid on application, a printed copy of this article and other printed matter bearing upon the subject*, which we are sure will prove instructive to all who have the interests of the public, the profession of medicine, or science, at heart. The personal attack upon ourselves is beneath our notice. The principle at stake is worthy the attention of every one, and this fact is our only apology for giving the above advice.

Through limited space we will here call attention but to one fact,—that Dr. Bigelow would convey the idea that we were seeking to destroy that just protection given to inventors by the patent law and to manufacturers by the law of trade-marks. We tell Dr. Bigelow, and the whole fraternity of quacks, that this is a willful perversion of our position. The patent law secures to an inventor any new and useful composition of matter; but *he must disclose the secret of his invention, and show that it is new and useful.* The trade-mark law is only to secure to the maker of a known article the benefit of any peculiar skill which he has brought to the making of the article. Hence he may adopt and own *any arbitrary sign to indicate his own manufacture* : this is the whole scope and end of the law of trade-marks.

Our war is against the abuse of these laws; against the practices of those spurious pharmacists who seek to draw the protection of these laws *over secret and unknown preparations.* We also denounce that kindred abuse where the *common or only name of an article* is claimed as a trade-mark. To allow this would be to allow the most odious form of monopoly; a monopoly of an article *the composition of which is kept secret and unknown.* Such a monopoly the patent law will not permit. Sound medical science will not permit it. It belongs to the domain of quackery pure and simple.

PARKE, DAVIS & CO.

DETROIT, MICH., March 1, 1882.

Send for "printed matter relative to the abuse of the patent and trade-mark laws."

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See page 278, June No. 1882.

THE PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.

The fifth annual meeting of the Association will be held in the Opera House, Altoona, commencing at 10 o'clock A. M., Tuesday, June 13th, and continuing through the following day. Orders for excursion tickets on the railroads leading to the place of meeting, can be obtained from the Secretary, J. A. Miller, Harrisburg, Pa.

A number of manufacturers of chemicals and pharmaceutical preparations have already secured space in the room for the exhibition. All who desire to place their goods in the exhibition will please notify C. F. Randolph, Asst. Secretary, Altoona, as early as possible.

The headquarters of the Association will be at the Logan House, where the members and their families will be entertained at reduced rates.

Members and those wishing to become members of the Association are urged to attend this meeting. Besides other important matters the adoption of the proposed pharmacy bill will be considered.

GEORGE A. KELLY, President

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THE POPULAR SCIENCE MONTHLY was established to raise the standard of popular reading in this country. Magazines are more and more taking the place of books; first-class minds are devoting themselves with increasing readiness to the work of popular instruction; and, when their sterling contributions upon the most important subjects could find no place in our widely circulated periodicals, it became necessary to have a magazine that would give expression to advancing scientific thought for the benefit of the more intelligent classes of the community. In the efficient performance of this service, THE POPULAR SCIENCE MONTHLY is now generally recognized as without a competitor.

The standard at which we have aimed and to which we have worked will be kept up and improved upon by increasing experience. Our articles will be, first of all, instructive and valuable, but no pains will be spared to make them also entertaining and attractive. While we will not cater to frivolity, we shall do all in our power to make the pages of the MONTHLY agreeable as well as useful.

Those who desire to know what is going on in the world of thought in these stirring times, when new knowledge is rapidly extending and old errors are giving way, will find it year by year increasingly necessary to subscribe for THE POPULAR SCIENCE MONTHLY.

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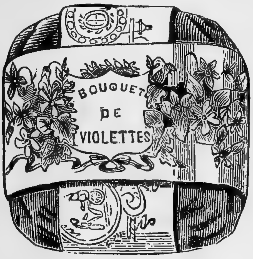

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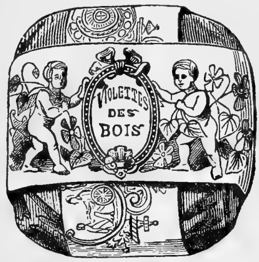

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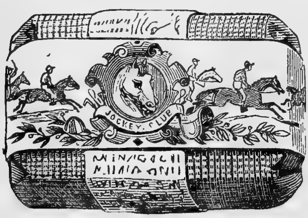

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American Pharmaceutical Association.

The members of this Association are hereby notified that the Thirtieth Annual Meeting of this Association will be convened on Tuesday, September 12th, 1882, at 3 o'clock, at Niagara Falls, New York.

The time, the place, and the unusual attractions which will be afforded the visiting members, will, beyond any doubt, make this one of the largest gatherings the Association has ever had.

The Local Secretary, Mr. Hiram E. Griffith, and the special committee on entertainment have perfected arrangements which will tend to the comfort and pleasure of visiting members, and which cannot fail to be an additional inducement to increase the attendance beyond previous years. These arrangements will be duly announced in a special circular to members, early in August.

The objects of the Association commend itself to the favorable consideration of every respectable pharmacist of our land, and it should have their hearty co-operation.

Its membership, now over 1300, enrols a large number of our best pharmacists, and it seeks the addition of good pharmacists to its membership, that they may enjoy its privileges and benefits.

Blank forms of application for membership will be forwarded to all persons who desire them, and who will write to either the President, the Secretary, Prof. J. M. Maisch, Philadelphia, or G. W. Kennedy, Pottsville, Pa.

P. W. BEDFORD, *President.*

New York, June 20, 1882.

See page 278, June No. 1882.

ESTABLISHED 1822.

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Graduates of Colleges of Pharmacy in good standing are admitted to the second course without examination.

The Lectures of the Winter Session of 1882-83 will begin on Monday, October 2, and end on the last day of March. The Preliminary Course will begin on the second Monday in September. In the Spring Months the laboratories of Chemistry, Pharmacy, Histology, Physiology and Pathology are open, and the post-graduate clinical course is continued.

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CHARLES FROEBEL, - - - - - *Professor of Analytical Chemistry.*
JOS. SCHRENC - - - - - - - - *Professor of Botany.*

THE FIFTY-THIRD ANNUAL SESSION, 1882—'83.

The lectures of this course will begin September 25, 1882, and continue until March 3, 1883. They will be delivered as follows:

	Senior Class.	*Junior Class.*
Botany and Materia Medica, by Prof. W. DeF. Day, M.D.........	Monday, 7.30 P.M.	Saturday, 2 P.M.
Chemistry ond Toxicology, by Prof, C. F. Chandler, Ph.D., &c....	Wednesday, 7.30 P.M.	Tuesday, 7.30 P.M.
Pharmacy, by Prof. P. W. Bedford..	Friday, 7.30.	Thursday, 7.30 P.M.

Analylical Chemistry under the direetion of Prof. Chas. Stroebel. Winter Session begins September 1st, 1882. Lectures, Monday at 4 P. M.

Laboratory Practice, daily from 8 A. M. to 1 P. M.—from September 1st, 1882, to February 28th, 1883.
For Terms and other information see Prospectus.

While every facility is afforded for prosecuting the study of the branches enumerated, the terms are exceedingly low, and the location one of the most central and easily accessible in the city. TWO FREE SCHOLARSHIPS for the Senior Class will be bestowed in each Sessions. For particulars see the prospectus.

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A Bureau for the EXAMINATION OF WEIGHTS AND MEASURES of Precision has been established by the College, which deals for the present with weights only. Correct and verified sets of weights, both common and decimal, are kept on sale at very low prices, and sets already in use are examined at a trifling fee.

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The Nation,

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Established in 1855, the *Nation* was a pionoer in this country as a weekly journal of literary and political criticism of the highest order, conducted free from the control of party or interest of any sort. Despite a prebarious support during the first few years, it held persistently to its original aim until its financial success was assured. Meanwhile it had become a recognized authority at home and abroad; its editorial management has been unchanged from the first, and its projectors intend that, with their present facilities, the *Nation* shall become more than ever before the medium of the ablest thought of the time.

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"	4	— 1832.	"	2, 3, 4.
"	5	— 1833.	"	2, 3.
"	13	— 1841.	"	2, 3, 4.
"	15	— 1843.	"	1, 2, 3.
"	16	— 1844.	"	2.
"	18	— 1846.	"	2, 3, 4.
"	19	— 1847.	"	2, 3, 4.
"	28	— 1856.	"	1, 3, 4, 5, 6.
"	29	— 1857.	"	2, 3, 5, 6.
"	36	— 1864.	"	2, 3, 4, 5, 6.
"	37	— 1865.	"	3, 5.
"	38	— 1866.	"	2, 3, 4, 5, 6.
"	39	— 1867.	"	2, 4, 5, 6.
"	42	— 1870.	"	2, 3, 6.

Most of the volumes and numbers in the above list can be supplied to a *limited extent only*, and some few of those *not enumerated*, the Committee are desirous to purchase, and invite those who may have them to spare, to communicate with the *Business Editor*.

To Members of the American Pharmaceutical Association.

The following is the Entertainment Committee's Programme for the 30th Annual Meeting of the American Pharmaceutical Association at Niagara Falls, Sep. 12, 1882. Headquarters will be at the Cataract House.

Meetings will be held in the Assembly Room of the Cataract House.

ORDER OF PROCEEDINGS.

Tuesday, September 12.

AFTERNOON AT 3 O'CLOCK, Meeting organized—President's address.

SAME TIME. While the Association is in session, there will be an excursion for ladies only, to Prospect Park, where a concert will be given by Wahle's Band.

EVENING AT 8 O'CLOCK, RECEPTION AND PROMENADE CONCERT. Instrumental music by Wahle's Band; Solo and Chorus singing by the Buffalo Singing Society, and Niagara Falls Liedertafel, both societies having kindly volunteered their services.

Wednesday, September 13.

MORNING SESSION. Meeting from 9 A. M. to 12 M.—Election of officers. Adjournment at 12 M. (according to previous custom) to visit the Pharmaceutical Exhibition at the Pavilion in Prospect Park.

AFTERNOON AT 3 O'CLOCK. Excursion in carriages by the entire Association to "Whirlpool Rapids," and "The Whirlpool," American side. T. J. Macmahan and W. H. Rogers will be in charge.

SAME TIME, Concert at the Cataract House.

EVENING AT 8 O'CLOCK AT THE CATARACT HOUSE, THE AMERICAN PHARMACEUTICAL ASSOCIATION'S BALL.

Thursday, September 14.

MORNING SESSION. From 9 A. M. to 1 P. M.—Reading and Discussion of Pharmaceutical Papers.

AFTERNOON AT 3 O'CLOCK, Excursion by the entire Association to Goat Island.

Carriages for ladies. Hiram E. Griffith will be in charge.

EVENING AT 8 O'CLOCK, Banquet, music and three-minute speeches.

Friday, September 15.

MORNING SESSION. From 9 A. M. to 1 P. M.—Reading and Discussion of Papers. Adjournment.

AFTERNOON AT 3 O'CLOCK, Independent Excursion to Burning Spring and Table Rock, on the Canadian side.

EVENING AT 8 O'CLOCK, Niagara Falls by electric light from Prospect Park; concert as well.

NOTE—Prospect Park and Goat Island have been secured by the Association during the time of its meeting. On your first visit to either place, your coupon ticket will be exchanged for a pass card, which entitles you to enter at pleasure within the specified time.

Wahle's Band has been specially engaged by the Association.

Important Request—Please Read Carefully:

It is the earnest and reasonable desire of the Council that members regularly attend the deliberations of the Association. After the first two meetings the greater portion of succeeding sessions will be devoted wholly to the reading and general discussion of Pharmaceutical Papers. Every member must appreciate the value of an interchange of ideas and experience, and it is specially urged that our meetings be attended by every member present.

YOU ARE SPECIALLY INVITED TO PARTICIPATE IN THE DISCUSSIONS.

PRICE OF TICKETS. Each member will be furnished with coupon tickets, embracing the entire programme from the commencement to the adjournment, as herein arranged. The cost of tickets has been fixed as follows:

To gentlemen, $5.00; to ladies, $2.50. Member and lady, $7.50.

Extra tickets can be obtained only by members.

It is almost superfluous to add that if each member selected a similar programme, it would cost at least thrice the amount fixed by the Entertainment Committee.

HOTEL RATES. Headquarters Cataract House, $3.00. The Committee will do all in their power to domicile the entire Association at the Cataract House. International Hotel, per day, $3.00. Hotel Kaltenbach, per day, $3.00. Goat Island House, per day, $2.50. Spencer House, per day, $2.50. Rapids House, per day, $2.50. Niagara House, per day, $2.00.

Members are requested when registering their names to affix the letters A. P. A. after their signatures, to ensure above special rates.

BUREAU OF INFORMATION. In the interest of convenience and order, the above bureau has been established at the "Cataract House," which will be in charge of a responsible person; he will have the name, hotel and room number of each attending member. He will also have in charge all correspondence or telegrams, and will see that they, as well as all written or oral communications addressed to members are promptly despatched; in fact, if you require any information concerning our programme, letters, telegrams, messages, tickets, meetings, or of Niagara Falls, he is the proper person to apply to. Please remember it, and report to the Entertainment Committee any unusual delay in the execution of requests or the transmission of messages.

SPECIAL CONCESSIONS MADE TO MEMBERS OF THE A. P. A. In case it should increase the pleasure of members to revisit places of interest, the following special rates have been obtained:

	Regular price	Mbrs
Whirlpool Rapids, American side,	$0 50	$0 15
The Whirlpool, " "	0 50	0 15
Whirlpool Rapids, Canadian side,	0 50	0 15
The Whirlpool, " "	0 50	0 15
Bridge to Canada and return,	0 50	0 25
Incline and ferriage to Canada,	0 50	0 25
Burning Spring, Canadian side,	0 50	
Incline Plane, Prospect Park	0 25	0 15
Art Gallery,	0 25	0 10

	Regular price	Mbrs
Shadow of the Rock, under the Fall including dress and guide,	1 00	0 50
Cave of the Winds,	1 00	0 50
Photographs of Falls and places of interest, at H. E. Griffith's Pharmacy		
Photographs of one person or party, with Niagara Falls in the background, for one picture, $1 50; per half dozen		6 00
Tintype with the shadow of the Rock as a background,		0 50

SPECIAL CARRIAGE RATES. (Limited to five adults). For the forenoon, $3.00; afternoon, $3.00; by the hour, $1.00.

To obtain these ratesorders must be left at the Bureau of Information, where they will receive prompt attention.

CAUTION. Indian relics (? ? ?) and fancy Caucasian beadwork (!), purchased on the Canadian side, are subject to duty on the American side; it is but prudent and just to state that, after careful investigation, we are of the opinion that similar goods can be purchased cheaper on the American than on the Canadian line of Niagara Falls. Caution, however, should be exercised on either side.

THE PHARMACEUTICAL EXHIBITION at the Pavilion, in Prospect Park, will be very large, complete, and interesting; its management will be under the supervision of Hiram E. Griffith; any correspondence relating to the same must be addressed to him at Niagara Falls.

RAILROAD RATES. Address all correspondence referring to railroad rates to Thomas J. Macmahan, 142 Sixth Avenue, New York City. Considerable pressure has been brought to bear on the various railroad corporations, but owing to "pools and combinations," no concession can be secured from the main lines; on this account you can make quite as favorable rates at home as we can. Should the so-termed pools be discontinued before September 12th, and special rates be obtainable, this committee will promptly send to each member a postal card giving full particulars, with rates from all important central points.

EXCURSIONS. An excursion will start Saturday morning at 10 o'clock, arriving at Toronto about 2 P. M. Leaving Toronto on board Royal Mail steamer, passing Thousand Islands next morning, and during the day through the Rapids and the whole length of River St. Lawrence, arriving at Montreal about 6.30 P. M. Monday will be spent in Montreal. From Montreal three routes have been selected.

EXCURSION NUMBER ONE leaves Montreal at 3.30 P. M., arriving at Plattsburg 6.50. Next morning, steamer on Lake Champlain to Ticonderoga; railroad to Baldwins, Lake George; steamer to Caldwell; railroad to Saratoga and Albany, and either day or night steamer down Hudson to New York. Tickets good to stop off at any of the places mentioned from Niagara to New York, $25.05. State rooms and Pullman charges extra. Time 5 or 6 days.

EXCURSION NUMRER TWO leaves Montreal 10 P. M., arriving at Gorham next morning 8·45. Stage to Glen House (2 hours): stage to Tip Top House (2 hours); Mount Washington railroad to Fabyans and Profile House, Crawford House, and railroad to Boston, passing Concord, Nashua, and Lowell, and Fall River to New York by Sound steamers. Tickets, good to stop off at any of the places mentioned, $41.50. State rooms and Pullman charges extra. Time 7 or 8 days.

EXCURSION NUMBER THREE. Same as number Two, except that it will extend to Quebec, thereby taking one day longer. Tickets $43.50.

Hotel rates will be about $3 to $3.50 per day. Pullman charges, $2 for double berth.

The probable expense of any of the excursions will be from $3 to $5 per day in addition to the cost of ticket.

REDUCED RATES. A liberal discount will be conceded from the above named rates at the proper time; all those desirous of accompanying any of the three excursions, will please address Thomas J. Macmahan, 142 Sixth Avenue, stating number of persons, in order that he may secure them proper accomodations.

SPECIAL OFFER TO MEMBERS. Members sending a P. O. Order or New York draft in advance for any number of tickets (lady's or gentleman's), will have rooms reserved for them by the Entertainment Committee. Make all remittances payable to order of George J. Seabury, address 21 Platt street New York. Those taking advantage of this offer will be assigned to their apartments by the person in charge of the "Bureau of Information" at the Cataract House, insuring no delay, no confusion; everything will be in readiness for you on arrival.

TO MAKE NEW MEMBERS. Members are respectfully requested to present this programme to at least one of their fellow pharmacists who has not yet joined our Association. Should the regularly appointed "Authorized Agents" of the A. P. A. be unable to procure an adequate number of applications for membership, then address the Permanent Secretary, J. M. Maisch, Philadelphia, Pa., or G. W. Kennedy, Pottsville, Pa.

SALUTATION. We apologize for having entered into details, and tender the Association, as an extenuation, the fact that this Committee was created "for a wise and beneficent purpose," believing it to be our duty not only to make the programme an acceptable new departure, but an unqualified and complete pharmaceutical and social success, worthy of perpetuation.

Wishing the Association great pleasure during the meeting, towards which we will cheerfully contribute our humble efforts, so that when the hour for departure and separation approaches, when we are again compelled to awaken to a realizing sense of our ceaseless duties, may the only regret be that our parting came too soon. Very truly yours,

GEORGE J. SEABURY, *Chairman*,
THOMAS J. MACMAHAN,
WILLIAM H. ROGERS,
HIRAM E. GRIFFITH, *Local Secretary*.
Entertainment Committee of the A. P. A.

New York, August 1, 1882.

See page 278, June No. 1882.

See page 278, June No. 1882.

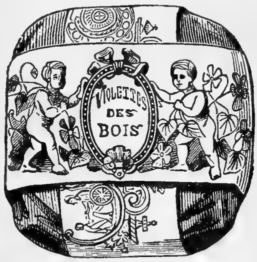
EECKELAER'S
TOILET SOAPS.

We would call the attention of druggists and of dealers in Toilet articles to the following line of soaps, manufactured by L. Eeckelaers, of Brussels.

We confidently recommend them as being UNRIVALED, both in QUALITY and PERFUME, by any soaps now offered, either of home or foreign manufacture.

These soaps are not surpassed by any in the market as to quality and perfume, and are sold at reasonable prices. We annex fac similes of the most popular kinds.

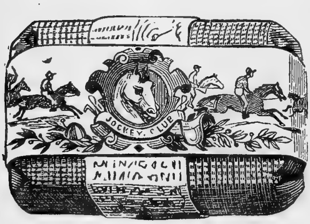
No. 77. $2.75 per doz.



No. 149. $2.75 per doz.

No. 73. $2.75 per doz.

No. 141. $2.00 per doz.



No. 154. $2.75 per doz.

No. 156 (6 odors). $2.00 per doz.

PRICES SUBJECT TO SPECIAL DISCOUNT.

For Sale by Wholesale Druggists and Jobbers throughout the U. S.

AGENTS FOR THE UNITED STATES,

E. FOUGERA & CO., 30 N. William St., N. Y.

We offer for prescription purposes a full line of

Absolutely Pure Powdered Drugs.

These goods are not only pure, but are

Carefully selected and choice in every way

Powders of Opium,

Cinchona, and other active Drugs, are assayed, and their Alkaloidal Strength stated on the label.

For sale by the Jobbing Trade generally.

Price lists may be obtained by addressing

Allaire, Woodward & Co.

Pharmaceutical Chemists,

Peoria, Ill.

See page 278, June No. 1882.

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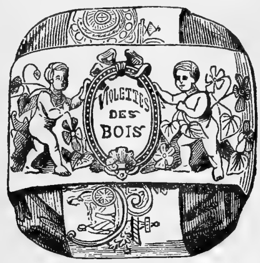

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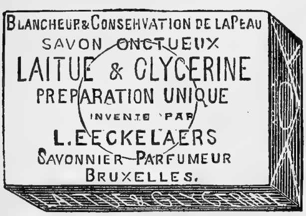

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AGENTS FOR THE UNITED STATES,

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IMPORTANT.

NOTICE TO THE TRADE.

Brooklyn, N. Y., September 1, 1882.

All Manufacturers and Dealers in Dentifrices of any kind will please take notice that the words "Angelic," "Angelica," "Angelique," or similar words used in connection with Tooth Washes, Tooth Powders, and Tooth Pastes in any way are my Trade Mark, and that I have the exclusive right to use these words in such connection. This Trade Mark was entered according to act of Congress, June 19, 1857, in the Clerk's office of the District Court of the United States for the Southern District of New York, and was registered in Washington, D. C., in June, 1877, under the old law, and also registered in the same place under the new law, as No. 8946, December 20, 1881, and has been used by me and my predecessors in business for more than twenty-five years.

Of late Fougera's Angelic Dentifrices have gained such high favor, both here and abroad, that many Dealers have added the very popular word "Angelic," or its like, to the name of their Dentifrice preparations, ignoring that they were infringing on my Trade Mark; but as my right to this Trade Mark is well acknowledged by the trade, the honorable and responsible parties who had begun to infringe upon it have desisted at once on being warned by me or my lawyers.

Any one using either of the words "Angelic," "Angelica," "Angelique," or their like, in connection with Dentifrices, be they Manufacturers, Wholesalers, or Retailers, are infringing on my Trade Mark, and will be prosecuted at law.

The genuine "Fougera's Eau Angelique Tooth Wash," "Angelic Tooth Powder," and "Angelica Tooth Paste," can be obtained by quantity from E. Fougera, Manufacturing Pharmacist, 372-374 Seventh Street, Brooklyn, New York, or from first-class wholesale houses.

None genuine without the signature below on the labels, also on the pink wrappers, and the name Fougera's &c., blown in the glass of every bottle of Tooth Wash and Tooth Powder.

E Fougera

BROOKLYN, N. Y.